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IN PLAIN ENGLISH

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Know When It's Time For A Database

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Straight Talk On Windows 98

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IN PLAIN ENGLISH

WINDOWS 98

WINDOWS COMPUTING

24 15 Top New Features In Windows 98

Our tour showcases the most important new features in Microsoft's latest operating system.

PC OPERATING INSTRUCTIONS

12 Begin Programming With QBASIC

All programming takes some training, but the easy-to-use QBASIC language is one of the simplest places to start learning the skills.

14 Defining The X In Windows 3.x

Learn the differences among the 16-bit Windows versions lumped under the catch-all term of Windows 3.x.

16 Windows 3.1 Stripped Down

Find out just what kinds of files you can access with a basic model, out-of-the-box Windows 3.1 operating system.

17 Resource Kit's Help File Treasures

The Windows 95 CD-ROM contains an often-overlooked Resource Kit packed with information from the folks who created the operating system.

20 Basic Training

Topics covered this month: Startup process, system files, and file extensions.

WINDOWS COMPUTING

28 Windows 98 For Free?

It takes a full upgrade to get all of Windows 98, but many of its features can be added to Windows 95 at no charge.

30 A Look At Windows 98

The latest Windows doesn't *look* that different from Windows 95, but we'll show you a few new interface tricks that can make your computing experience better.

GENERAL COMPUTING

32 Who's Who In Computing

Computing industry players don't just make headlines; they make many of the rules for the way you work. Our guide to top companies in hardware, software, and the Internet helps you keep up with who's doing what.

38 Voice Recognition Advances

Can users finally control computers with spoken commands? Our reviews of the latest voice-recognition packages check whether your voice really works as the input device of choice.

COMPUTING BASICS

42 A Formula For Formulas

There's a method to the madness of all those symbols and numbers in spreadsheets. We decode common formulas so you can begin to harness the power of your spreadsheet.

OFFICE COMPUTING

46 Spreadsheet vs. Database

Many offices handle data records with a spreadsheet, but every businesses should be able to spot the critical point when it's time for a real database.

50 Build A Web Site, Part 2

Our three-part series shows you how to build a simple World Wide Web site. In part two, we add special features such as hyperlinks and graphics and post the site to the Web.

54 Shopping For Portables

The numerous choices in mobile computers grow more manageable when you break down the market. Our shopping guide tells you what to expect in major categories.

QUICK STUDIES

57 Lotus 1-2-3 5.0: Make Worksheets Look Great

58 Microsoft Excel 97: Jazz Up Worksheets With Clip Art

59 Web Browsers: Printing World Wide Web Pages

60 Going Online: Rule Your Inbox

61 Microsoft Word 97: Creating Mailing Labels

62 PowerPoint 97: Create Custom Slide Shows

63 HTML:
Creating Graphical Links

64 WordPerfect 6.1:
Time-Saving Macros

65 Quicken Deluxe 6.0:
Investment Tracking, Part I

66 Print Shop Premier:
Working With Labels

67 Microsoft Works 4.0:
Sending Faxes

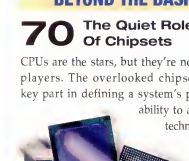
New!

68 Quick Tips
Secrets To Succeeding In Common Tasks

BEYOND THE BASICS

70 The Quiet Role Of Chipsets

CPUs are the stars, but they're not the only players. The overlooked chipset plays a key part in defining a system's power and ability to accept new technologies.



UPGRADING

73 Moving To Windows 98

When you're ready to leap to the new operating system, use these guidelines to make the transition a smooth one.

TROUBLESHOOTING

77 Monitors

Follow our simple tips to ensure you get a solid, clean picture on your system.

PLUGGED IN

81 Ring Around The Web

Learn all about Webrings, a fast and easy way to surf World Wide Web sites devoted to a common theme.

83 Internet Phone Calls

If you make lots of long-distance phone calls, the Internet can help you decrease your bill.

86 Your Internet Forecast

Online traffic and weather reports explain the best times to venture onto the Web—and when to stay off and avoid the crowds.

TIDBITS

90 Comparison Shopping

Look around before you buy that computer equipment. Our price checking reveals surprising price variation, even among stores in the same chain.

5 Technology News
8 Notes
88 Find It Online
92 Q&A
98 Action Editor
99 Glossary Of Terms
100 Editorial Comment

Corrections/Clarifications:

- AudioNet, described in our July 1998 article "Audio & Video On The 'Net" has changed its name to Broadcast.com. You can reach it at http://www.broadcast.com.

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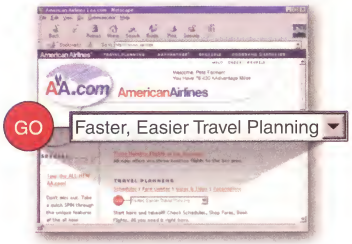

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TECHNOLOGY NEWS

Compiled by Joel Strauch

Breaking Up (Microsoft) Is Hard To Do

The federal government and 20 state governments filed sweeping antitrust lawsuits against Microsoft Corp. in May, charging the software company with using unfair tactics to crush competition and restrict consumer choice. The lawsuit will have little impact on Windows 98 (Win98), Microsoft's new operating system that is integrated with its *Internet Explorer* World Wide Web browser, which shipped to PC manufacturers in May. A possible extreme outcome, however, could break up Microsoft.

U.S. District Judge Thomas Penfield Jackson set a Sept. 8 trial date. The suits allege Microsoft used a variety of illegal practices to deny PC owners the benefits of a competitive market and extend its operating system monopoly into the browser market. The federal suit also seeks a preliminary injunction that would force Microsoft to provide consumer choice by adding the major browser rival, *Netscape Navigator*, to Win98.

Antitrust laws forbid "the barrage of illegal, anticompetitive practices that Microsoft uses to destroy its rivals and to avoid competition," federal antitrust chief Joel Klein told a news conference.

Microsoft Chairman Bill Gates says "the government is wrong to attack innovation" and the suits are baseless. "This is a step backwards for America, for consumers, and for the personal computer industry that is leading our nation's economy into the 21st century," he says.

The suit by the 20 states and District of Columbia surpasses the federal effort. The states are attacking Microsoft's "office-productivity suite," which contains products such as *Microsoft Word* and *Microsoft Excel*. As with the browser, the states want a court order forcing these products to be unbundled from the operating system.

Federal and state officials also allege that Microsoft approached Netscape and offered to divide the market rather than compete; Netscape allegedly rejected that proposal. Gates flatly denies any such meeting. "Absolutely not, we never had any meetings of that kind, in any way, shape, or form," he says. "That's an example of the kind of outrageous leak and outrageous lie we're hearing in this case."

Klein says Microsoft could avoid the preliminary injunction by separating its browser from Win98, but the company says the browser is now inextricably integrated into the operating system. The injunction, if granted by a federal court, also would let PC manufacturers pick which browser or browsers they want to include on their machines and to alter the first screen that users see from the one designed by Microsoft.

The federal lawsuit contains excerpts from Microsoft's internal documents indicating the company wasn't sure its browser would succeed on its own merits. On Feb. 24, 1997, for example, Microsoft's Christian Wildfeuer wrote: "It seems clear that it will be very hard to increase market share on the merits of IE 4 (Internet Explorer) alone. It will be more important to leverage the OS (operating system) asset to make people use IE instead of Navigator." ■

A Microhistory Of Microsoft's Battles

1991—The Federal Trade Commission (FTC) begins to investigate claims Microsoft monopolizes the market for PC operating systems.

1993—The FTC deadlocks on two votes to file a formal complaint against Microsoft and decides to close the investigation. Justice Department and European Commission antitrust investigators begin independent probes.

1994, July—Microsoft agrees to change contracts with PC makers, ending the United States and European antitrust investigations.

1995, April—Justice Department blocks Microsoft deal to purchase Intuit, maker of *Quicken* personal finance software, saying the deal could lead to higher software prices and diminish innovation.

1995, August—Microsoft launches Windows 95.

1995, November—Microsoft releases *Internet Explorer 2.0*, giving it away in challenge to *Netscape Navigator*.

1997, August—Microsoft and Apple Computer unveil deal requiring Apple to make Internet Explorer easier to use than Navigator.

1997, October—Justice Department sues Microsoft, alleging Microsoft violated the 1994 consent decree by forcing computer makes to use its browser as a condition of using Windows.

1998, May—Justice Department and 20 state governments file a lawsuit accusing Microsoft of anti-competitive practices.

Internet S.O.S.

Sher McConnell's desperate plea for help posted on an Internet chat room prompted a white knight in Minnesota to call Alaska State Troopers, who arrested McConnell's roommate for domestic assault.

McConnell of Fairbanks, Alaska, was logged onto the **chat room**, where users exchange nearly instant text messages, with some online friends. She told them her roommate, Mitchell Testu, had become belligerent and had torn two telephones out of the wall. Her friends on the 'Net implored her to get away. "I tried to leave and he wouldn't let me," McConnell says. "That's when I came back and typed in, 'I can't leave.'"

One of her chat-room friends, known only as Jerry from Minnesota, typed in a response. "He said don't worry about it, that he has a friend who is a cop, and that his friend will take care of it," she says. Still, she didn't expect help so quickly. Alaska State Troopers arrived at her home about 15 minutes later.

"I thought it would take hours and hours," she says. "I was very, very scared. . . . I didn't know if they would get here in time or if (my roommate) would do something more."

Silence Of The Beepers

The Galaxy IV satellite, which provides service to about 45 million pagers across North America, rolled out of position recently after an onboard computer control system failed. Paging companies and radio and TV stations that used PanAmSat's Galaxy IV for communications and paging services were asked to adjust their antennas to alternate satellites.

Most customers were out of service for several days and many for nearly a week. PanAmSat does not plan to restore its communication services through the $250 million satellite that moved into a higher orbit, company spokesperson Dan Marcus says. Instead, a replacement satellite will be launched at the end of next year.

Just One More 'Net Fix

People who seem addicted to the Internet often show a bumper crop of psychiatric disorders such as manic-depression, and treating those other conditions might help them rein in their urge to be online, a study suggests.

On average, Internet "addicts" in the study reported having five psychiatric disorders at some point in their lives, a finding that "just blew me away," says psychiatrist Nathan Shapira of the University of Cincinnati College of Medicine.

It's unclear whether the Internet problem should be considered a disorder or just a symptom of something else, or whether certain disorders promote the excessive online use, he says. He and colleagues studied 14 people who had spent so much time online that they were facing problems such as broken relationships, job loss, and dropping out of school.

One 31-year-old man was online more than 100 hours a week, ignoring family and friends and stopping only to sleep. A 21-year-old man flunked out of college after he stopped going to class. When he disappeared for a week, campus police found him in the university computer lab, where he had spent seven days straight online.

Being hooked on the Internet is not a recognized disorder. But Shapira says the excessive online use by the study participants would qualify as a disorder of impulse control, in the same category as kleptomania or compulsive shopping. In fact, he suggested the Internet problem be called "Internetomania" or "Netomania," rather than an addiction.

But the striking thing, Shapira says, was the other psychiatric problems that turned up among Internet addicts:

- Nine of the 14 had manic-depression at the time of the interview, and 11 had it at some point in their lives.
- Half had an anxiety disorder such as "social phobia," which is a persisting and unreasonable fear of being embarrassed in public, at the time of the interview.
- Three suffered from bulimia or binge eating, and six had an eating disorder at some time in their lives.
- Four had conditions involving uncontrollable bursts of anger or buying sprees, and half reported such impulse-control conditions during their lives.
- Eight had abused alcohol or some other substance at some time in their lives.

Tech Shorts

Eveready's Energizer unit is pushing a new line of batteries it says will keep high-powered electronic devices running 60% longer than conventional batteries. The new Energizer advanced formula line is the St. Louis company's answer to Duracell's recent introduction of its new Ultra battery line. Duracell says the Ultra line lasts up to 50% longer than traditional batteries in increasingly popular high-drain devices such as digital cameras, palmtop computers, and minidisc players.

Quantum Corp. has announced a hard drive that can stand up to some abuse. The new Quantum Fireball EL drive features the Shock Protection System (SPS), a technology involving an extensive redesign of the mechanical platform. The SPS will protect the drive against the impact of mishandling during shipping or integration into a PC. The EL drives will be available in 2.5 gigabytes (GB, $169), 5.1GB ($199), 7.6GB ($269), and 10.2GB ($359).

Apple Computer Inc. has unveiled its new iMac, a $1,299 233 megahertz (MHz) G3 machine that Apple hopes will boost the struggling company as the 1984 Macintosh did. The sleek machine features a built-in 15-inch monitor, 32 megabytes of (MB) random-access memory (RAM), a four gigabyte (GB) hard drive, 24-speed (24X) CD-ROM drive, and, interestingly enough, no diskette drive.

Hardware

New input devices are usually nothing to double-click about, but Logitech's innovative TrackMan Marble + isn't Mickey Mousing around. This thumb-activated trackball device retails for $79.95 and includes a scrolling wheel that not only lets you move up and down in World Wide Web pages, but any other scrollable page as well. If you depress the scrolling wheel, you can **use the trackball to move left and right besides up and down** (800/231-7717, 510/795-8500, http://www.logitech.com). . . . Talk and look with AVerMedia's new InterCam, a $129 kit for **videoconferencing, video E-mail, and video/image capture**. The kit includes a desktop camera, microphone, Peripheral Component Interconnect capture card, and the software needed to get you started with video communication (510/770-9899, http://www.aver.com). . . . Don't let your PC keep you from getting enough exercise. Rather, use it to help you keep on track with IM Systems' BioTrainer. This pager-sized device, retailing for $89, **monitors a full range of exercise activity from daily lifestyle to aerobic workouts**. With the optional PC download kit ($69), you can transfer the gathered data to your computer and display it in a spreadsheet or print it (888/513-5960, 410/296-7723, http://www.imsystems.net). . . . Save desk space with ViewSonic's PS790. This $849 monitor provides **big-screen performance with a small-screen footprint**. The 19-inch (18-inch viewable) monitor utilizes Short Depth Technology while only extending back as far as the average 15-inch screen (800/888-8583, 909/869-7976, http://www.viewsonic.com). . . . Being a klutz around your computer can be a pricy cross to bear. With Memorex's new Spill Proof Keyboard, at least your input device will be safe from your butterfingers. In addition to a **spill-proof design that prevents damage from liquid spills**, the keyboard features input speed control to let a PC user adjust data entry speed based on typing ability, and a locking mechanism for security and peace of mind (800/636-8368, 562/906-2800, http://www.memtek.com).

Logitech TrackMan Marble +

Software

Feeling a little lost in space? Catch up with Sumeria Inc.'s second edition of *Space: A Visual History*. This hybrid CD-ROM for Macintosh and Windows is $49.95 and contains more than **50 minutes of footage from NASA missions** including Mercury, Gemini, Apollo, and space shuttle flights. As with all Sumeria products, the movies, photographs, maps, and text on the CD may be reused royalty-free for any educational or non-commercial purpose (415/904-0800, http://www.sumeria.com). . . . DataViz has shipped the latest version of *Conversions Plus*, adding decompression, decoding, and What You See Is What You Get (WYSIWYG) viewing technology to its file format translation program. The 4.0 version is available at a street price of $99 (or a $39.95 upgrade) and features **automatic file conversion for Windows 95 and NT**, E-mail attachment decoding, and Mac to PC translation (800/733-0030, 203/268-0030, http://www.dataviz.com). . . . Individual Software Inc.'s new *ResumeMaker* brings job searching of the future to job seekers today. The $39.95 software is **integrated with online job search features** including Job Finder, a search tool, and Résumé Caster, which automatically posts résumés to every major résumé bank and career site on the Web (800/822-3522, 925/734-6767, http://www.individualsoftware.com). . . . If you send a plethora of compressed files via E-mail to your recipients, check out JE Software's *E-MailZIP Deluxe*. This $29.95 program lets you quickly **explore your directories, select the files you want to compress, and mail them off**—without even having to open your mail reader (800/431-1348, 914/699-6710, http://www.e-mailzip.com). . . . Tyred uv speling errers? Get Casady & Greene's new *Spell Catcher*. This utility, which sells for $39.95, **works in any text-based application** including WordPad, Notepad, E-mail, browsers, word processors, and contact managers. With easy access from the Taskbar and interactive spell checking, you no longer have an excuse for errors (800/359-4920, 408/484-9228, http://www.casadyg.com).

Spell Catcher

Business

Adobe Systems has shipped its new *Adobe PhotoDeluxe Business Edition*, the first **digital imaging software solution designed specifically for small businesses**. The software, which sells for $99, comes with hundreds of photo projects, professionally designed templates, special effects, and sample photos based on input from small-business customers (800/833-6687, 408/536-6000, http://www.adobe.com). . . . Keep your Rolodex up-to-date with Information Technology Group's *Area Code Update*. This software and service helps **maintain an accurate database with periodic downloads of area code changes**. A single-use software package costs $179, and a single central processing unit annual subscription service costs $295 (877/228-3283, 773/714-2370, http://www.areacodeupdate.com).

Compiled by Tom Mainelli & Michael Sweet

A Zippy Toolkit

A little magic goes a long way in this excellent utility from Mijenix Corp. *ZipMagic98* provides absolute control over your compressed files (the most common kind being those with the .ZIP extension) and a whole lot more. As zipped files become increasingly common, mainly as E-mail attachments, tools such as ZipMagic98 become essential accessories.

One of the utility's most interesting features is its ability to zip and unzip files on the fly. That means you don't have to go through the process of opening a decompression program and unzipping compressed files before using them. ZipMagic handles the conversion in a process unnoticed by users when they open files.

Most of the work you'll do in ZipMagic takes place in the ZipTools program, an interface similar to Windows 95's Windows Explorer. In fact, we did just about everything in ZipTools that is possible in Explorer. We could move, copy, rename, delete, open, and run zipped or unzipped files and folders. Of course, we could zip and unzip files and folders in Explorer also, but the best way to create a zip archive (a collection of files) or extract a file from a zip archive is to use the ZipMagic98 Wizard.

The Wizard proved to be convenient as we created a few archive folders and then extracted some of the files stored in the archives. The Wizard will find and display all the zipped archives on your system, which can come in handy when you can't quite remember the name of an archive.

Zipped files are convenient on the creation end, but normally if you send a zipped file to someone, they can't use it without the necessary unzipping software. ZipMagic takes care of that problem with its option for saving any zipped archive as a self-executable file (.EXE). Like any self-executable file (such as the installation program for new software), users just double-click the icon to open and run the file. No unzipping required. This is definitely one of the program's strongest features.

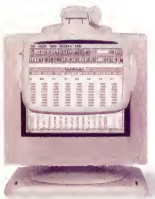
ZipMagic98 includes a couple of extras in the form of plug-ins. One called ZipMail will automatically zip any file attachments you include in your E-mail. Another, called ZipSurfer, lets you download, install, and run a zipped file without the always-annoying step of leaving your Internet browser.

Then there is the viewer. ZipMagic98 lets you preview files in more than 50 different formats, including .JPG, .GIF, .TIF, .PCX, *Microsoft Word*, *Lotus 1-2-3* version 4, and many other popular file types. To view some file formats, you'll need *Quick View* on your system. You should have it on your Windows 95 CD, or you can download it from the Mijenix Web site.

This great utility is worth a look from any user that works with zipped files. It's compatible with Windows 3.1, Windows 95, Windows 98, and Windows NT and retails for $39.95.

ZipMagic98
Mijenix Corp.
(800) 645-3649, (303) 245-8000
http://www.mijenix.com ■

I Can See Clearly Now



If you find yourself unconsciously leaning closer to your computer monitor as you work, you're probably straining your eyes as well as your back (due to poor posture). Bausch & Lomb's PC Magni-Viewer lens eliminates the need to lean by magnifying on-screen information 175%. If word processing documents don't show up clearly through this $250 product, it's time to get a new pair of glasses.

The Magni-Viewer is a cleverly designed contraption with a base that slides under your 13-, 15-, or 17-inch monitor. A fully adjustable swing arm lets you position the acrylic lens right where you need it, or maneuver it out of the way when you don't.

It takes a few minutes to adjust to using the viewer, but it's less disconcerting than you might think, and the benefits to your posture are immediate. A beneficial side effect to using the viewer is that you actually can squeeze more information on the screen, a trick particularly useful when viewing spreadsheets or desktop-publishing projects.

PC Magni-Viewer
Bausch & Lomb
(800) 771-1168
(716) 338-6000
http://www.bauschvision.com ■

Great Rates Without The Wait

Every business from *Fortune* 500 powers to local Mom and Pops depends heavily on the mail, and not just the electronic kind. Whether it is brochures, books, or bills, everyone has stuff to send. But without the most current rates for the different carriers, a lot of money could be unnecessarily going out the door along with the mail. You can put an end to that with two things: a scale and *ProRate*.

This program asks only for the weight of the item you want to send. It then instantly determines the item's postage. ProRate software contains the latest postal rates available for the major carriers including the U.S. Postal Service, UPS, FedEx, Airborne, and DHL. Comparison shopping becomes an instant process, and ProRate automatically highlights the cheapest rate. It will also list the type of service such as Standard, Priority, or Express. The software has a 5-pound weight limit, so don't think you'll use it to find the cheapest way to send an armoire to Latvia.

But you will be able to find the cost of sending anything *under* 5 pounds to Latvia, Estonia, or almost anywhere else in the world. Need to send something to Tunisia? ProRate will find the fare. Federated States of Micronesia? UPS can get your package there—for a price. Send a birthday card to that cousin in the Netherlands Antillies for only $18 via USPS Express.

ProRate includes a Client list, so you can keep track of where you're sending packages. Entering a client into the program is a snap, and it'll be useful if you decide to use the transaction log. The log tracks such things as the date, time, client, weight, destination (country only), carrier, service, and rate. It provides a clear picture of how much stuff you're sending to whom, where it's going, and how much it's costing. Unfortunately, ProRate won't let you print a hard copy of this information.

ProRate retails for $49.95 and runs on Windows 95. ProRate offers a subscription service for $49.95 per year. For that, you'll receive the latest upgrades of the ProRate software, in addition to rate change updates as they occur.

ProRate
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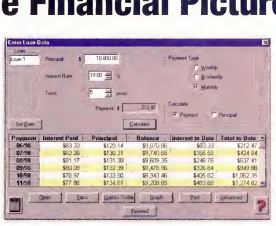
http://www.pelouze.com ■

Clear Up The Financial Picture

Vorton's *Financial Tools* can help anyone who becomes skittish around terms such as "amortization" or can't quite remember all the rules for figuring out compound interest. This program is designed to make financial matters as painless as possible. It removes the guesswork from determining things such as monthly payments on a mortgage or other type of loan, or how much you need to start saving for retirement.



Use the Loan Wizard to create a detailed analysis of your loan.

We started with the Loan Wizard. The program also has wizards for mortgages, bonds, savings, and retirement planning. But we're itching to buy a new car and wondered how much our loan payments would be per month. We simply plugged in the principal, interest rate, and term, and let the wizard do the rest. It determined our monthly payments and even generated an extensive chart tracking data for the life of the loan. The chart includes information such as the amount of interest paid, the remaining balance, and the total paid to date. You can display the information in monthly, weekly, or bi-weekly payment periods.

We fiddled with the numbers a bit to see how much our monthly payment would change with some new loan parameters. You easily can change the principal, interest rate, or term at any time and recalculate the payment instantly. This handy feature helped provide an idea of how much our monthly payments would be in several scenarios.

The program's other wizards proved just as easy and convenient. If you want to evaluate your finances, but don't have a head for numbers, this software should earn your interest. Financial Tools sells for $19.99 and runs on Windows 95 or NT.

Financial Tools
Vorton Technologies
(613) 721-1107, ext. 200
http://www.vorton.com ■

NOTES

Undo The Damage

Once you discover an application's Undo feature, you'll never doubt its usefulness again. Accidentally type over an important paragraph? No problem; just undo the damage. It can be a lifesaver.

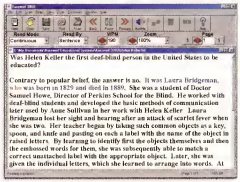
Now imagine an undo feature with system-wide capabilities. *Undo-it* for Windows 95 and Windows 98 from Kiss Software lets you take back mistakes such as overwriting an existing file, copying one to the wrong place, or even deleting one. Undo-it can turn those potential computing nightmares into minor annoyances.

The program works in the background tracking your actions and storing a record of them on your PC's hard drive. You decide how much storage space to dedicate to the cause; 20 megabytes is the default setting. When you make a mistake and need to Undo-it, you go to the program's icon on the Windows 95 Taskbar and retrace your steps to those preceding the miscue.

Two routes are available to finding your pre-disaster file; you can examine a list of file actions grouped by program or by chronological order. The program list is generally easier to navigate, the file list more comprehensive. Once you read through the lists (a potentially daunting task), you select the correct file to undo the damage. The program is even nice enough to add "undo" to the new file name, so as not to automatically save over your current version (yep, it's smarter than you).

Our only complaint about Undo-It is that navigating the list of file actions and restoring your work can be confusing until you get the hang of it. If you're prone to keyboard mistakes, however, you'll probably get enough practice to figure it out fairly quickly. In fact, if you're the type who's susceptible to more than the occasional catastrophic computer miscue, Undo-it's $40 price tag is well worth the insurance it buys. Just plan to spend a little time figuring out how to use the program *before* your next mistake, so you don't have to learn during a crisis situation.

Undo-It
Kiss Software Corp.
(888) 454-7726
(714) 979-5477
http://www.kissco.com ■


Was Helen Keller the first deaf-blind person in the United States to be educated?

Contrary to popular belief, the answer is no. It was Laura Bridgeman, who was born in 1829 and died in 1889. She was a student of Doctor Samuel Howe, Director of Perkins School for the Blind. He worked with deaf-blind students and developed the basic methods of communication later used by Anne Sullivan in her work with Helen Keller. Laura Bridgeman lost her sight and hearing after an attack of scarlet fever when she was two. Her teacher began by taking such common objects as a key, spoon, and knife and pasting on each a label with the name of the object in raised letters. By learning to identify first the objects themselves and then the embossed words for them, she was subsequently able to match a correct unattached label with the appropriate object. Later, she was given the individual letters, which she learned to arrange into words. At

***Kurzweil 3000* turns any on-screen text into an audio book.**

It Speaks To Me

Perfect reading skills *aren't* a prerequisite for using PCs. A new Kurzweil Education Systems product can circumvent reading problems for youngsters or someone suffering from a learning disability that makes reading difficult. The *Kurzweil 3000* print-to-speech program reads aloud the printed words you feed it. Those words can come from just about anywhere including word processing documents, World Wide Web pages, even scanned pages from books and magazines.

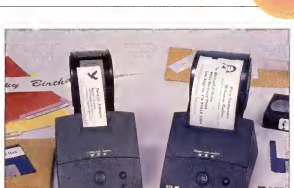
We had the product reading our text documents in a matter of minutes. It highlights each word as it reads, making it a great teaching tool. A wealth of features help each user customize the program to their specific needs. For example, you can select from different voice pitches and set the speed (words per minute). Other useful features include a 175,000-word dictionary, a function that spells out words, and a syllable button that breaks down words. There is also a little voice-command programming.

Kurzweil 3000 has a few problem areas. One is the system requirements. Most of the hardware needs are reasonable: a Pentium processor, 32 megabytes (MB) of random-access memory (RAM), CD-ROM drive, sound card, and speakers. Tougher to accommodate is the required 70MB hard drive space (for program files) and the additional 100MB of free disk space necessary for proper operation. That is hard to find on smaller hard drives. Also, to read from the Web you must use *Microsoft Internet Explorer 3.0*. Users of Explorer 4.0 or a Netscape product must switch from the new browsers to this older one.

The software-only package we tested costs about $249; the software plus a high-end scanner package costs $1,995 (that had better be a great scanner). It's not cheap, but Kurzweil's extensive research and development behind the software justify the cost. Anyone who's struggled with reading will probably attest that the freedom of reading on their own is worth the price.

Kurzweil 3000
Kurzweil Educational Systems Inc.
(800) 894-5374
(781) 893-8200
http://www.kurzweiledu.com ■

NOTES



Labels Without The Labor

Owners of Seiko's Smart Label Printer 220 should keep it close by. It has plenty of uses. Whether you need an address label, a name badge, or simply a label for a folder in the file cabinet, the Smart Label Printer is up to the task. The Smart Label Printer isn't designed to print labels for mass mailings, but it excels at smaller jobs.

The hardware and software setup take just a few minutes. Plus the hassle factor stays low because this is a thermal printer, which means you don't have to mess around with ink cartridges. It takes about three seconds to print the 1- or 3-inch labels.

Once the Smart Label Printer is up and running, you'll notice lots of stuff that needs to be labeled—folders, diskettes, people in the office whose names you never can quite remember. It only takes a few seconds to make labels and a mouse click to switch among label types.

One feature we especially like is the ability to customize labels with items such as artwork or photos. Art and photos only appear in black and white, however, and you don't want to use anything too detailed because of the printer's low resolution. In general, however, this is a great way to customize labels. The Smart Label Printer 220 retails for $299.95.

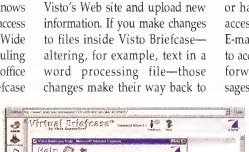
Smart Label Printer 220
Seiko
(800) 688-0817
http://www.seikosmart.com ■

Open Your Briefcase From Anywhere

Anyone who travels for business, or sometimes does office-related work on a home PC, knows the frustration of needing to access files, E-mail messages, World Wide Web bookmarks, and scheduling or contact data stored on the office PC. Visto Corp.'s Visto Briefcase service provides access to this information from any PC with Web access.

It works like this: You direct your Web browser to http://www.visto.com. From here you set up a Visto Briefcase account and select a login name and password. Next you install the *Visto Assistant* software on your PC. The free software is available for download or on CD-ROM from the company.

After installing the software, you just copy the files you want to access into your Briefcase and set a synchronization time (at least once a day, probably more) when your desktop PC will contact Visto's Web site and upload new information. If you make changes to files inside Visto Briefcase—altering, for example, text in a word processing file—those changes make their way back to your desktop PC during the next synchronization.



The Visto Briefcase World Wide Web site provides Help sections that simplify access to your data.

Visto Briefcase works from both standalone computers using modems and machines operating on corporate networks, even those protected by **firewalls** (software or hardware that limits outside access). The service checks your E-mail by using your desktop PC to access the mail server and then forwarding a copy of the messages to your Visto account. The downside to this convenience is that your office machine must stay running when you leave.

We found Visto's service easy-to-use and effective. The Visto Assistant software makes setting up your desktop system a snap. The well-designed Visto Briefcase Web site makes accessing data a simple process. That access, especially to incoming E-mail, from any Web-based machine makes working outside the office a more appealing option.

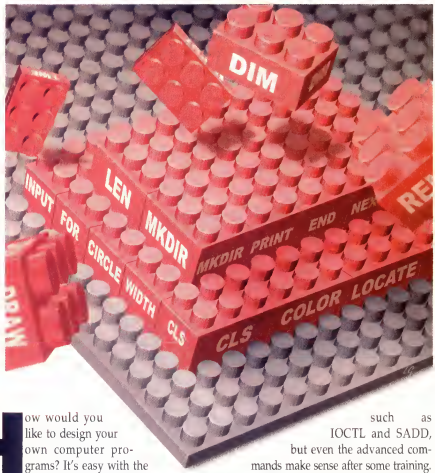
The service's regular cost is $19.95 per month for 20 megabytes (MB) of briefcase space on Visto's secure server. The company currently offers an introductory rate of $9.95 a month and a free trial for the first 30 days. The service is constantly being improved, too. During our testing Visto added a handy calendar feature to the mix.

System requirements include Windows 95 or NT, at least 15MB of free space on your hard drive, 16MB random-access memory (RAM), a 486-based processor or better, and (of course) Internet access. To access your briefcase you'll need a PC with Web access and *Microsoft Internet Explorer 3.02* or newer, *Netscape Navigator 3.02* or newer, or *Netscape Communicator 4.0* or newer.

Visto Briefcase
Visto Corp.
(650) 961-2400
http://www.visto.com ■

DOS

Begin Programming With QBASIC



How would you like to design your own computer programs? It's easy with the *QBASIC* programming language. At least among seasoned computer programmers, learning the QBASIC programming language is considered easy. That opinion sounds like a matter of perspective to us. Even though the acronym BASIC stands for Beginner's All-purpose Symbolic Instruction Code, that title sounds like beginning brain surgery to some people.

Take heart: QBASIC isn't that difficult. Its language structure, or **syntax**, uses English words and phrases, punctuation, and algebra-like equations. It does have its share of cryptic commands, such as IOCTL and SADD, but even the advanced commands make sense after some training. With some study and trial and error, you'll be able to create DOS computer programs, from simple games to complex business applications. Everyone has to start somewhere, and this is the perfect place for a beginning programmer. It's free and easy to learn. We can't teach you to program with QBASIC in this space, but we can introduce you to the possibilities with using this beginner-oriented language.

What Is Programming? Programming is the process of designing and writing computer programs. Writing a computer program begins with knowing what you want to do and putting together a series of tasks that work together to accomplish your goal. Programmers decide which problems to solve, develop the logic to solve it, and write the codes that will instruct the computer as to how that logic is to be applied. One way of reaching this goal is to create diagrams called **flowcharts** that show how the program should work. These flowcharts are graphical representations of a series of decisions and their resulting effects in the order in which they might occur. Another program-writing method lets programmers use everyday language to outline how a program is supposed to work. This method is called **pseudo-coding** because the result often closely resembles the codes of a real program. The programming language comes into play when writing, so your wishes can be translated into a machine language that a computer can understand and execute.

The Beginning. QBASIC is a version of BASIC, which first appeared in 1975. Later came MBASIC and then GWBASIC/BASICA (with DOS). BASIC was the first high-level, easy-to-use programming language used with microcomputers. Long before DOS existed, it was ported to microcomputers as MBASIC by a then-young man you might have heard of—Bill Gates.

Released in July of 1991, QBASIC comes with MS-DOS 5.0 and newer, Windows 95, Windows 98, and even Windows NT. This makes it the most widely distributed programming language in the world; yet its use is minute. Professionals ignore it in favor of more powerful and in some ways easier tools (such as Visual BASIC), and few beginners know it exists.

Even though it is not well-known, QBASIC is a free, easy-to-learn language. If you've never done any programming and want to get an idea what it's like, QBASIC is for you. If you have specialized formulas or a recurring question-and-answer procedure you want to automate but don't want to put in a spreadsheet (or want to distribute to folks that don't use spreadsheets) you might try QBASIC. For example, a firefighter could write a simple program that asks trainees questions about the diameter of a fire hose, the pressure available, and hose length, then tells them how many gallons per minute the hose can yield. On the World Wide Web you'll find a multitude of such freeware and shareware QBASIC programs.

QBASIC vs. Visual BASIC. QBASIC was eclipsed by Microsoft's Visual BASIC when it came out. Visual BASIC is also based on BASIC. It was one of the first products to provide a graphical programming environment. Although virtually any line of QBASIC code is still usable in Visual BASIC, there are big differences. To name a few: (1) You can't write true Windows programs in QBASIC (they'll run under Windows in DOS boxes), (2) Visual BASIC makes it easy to write programs because it responds to the mouse, on-screen buttons, and drag-&-drop tools, thus allowing creation of things that would take hundreds of lines of handwritten code in QBASIC. (3) Visual BASIC *requires* **compiling** (a step where your human-readable code is converted into a easily distributable autonomous runnable program); QBASIC is an interpreter, running programs as is, making it easy to test, but clumsy to distribute or protect (unless you buy a separate compiler). (4) QBASIC doesn't thrive on large programs, being limited to directly accessing no more than 0.16 megabytes (MB) of memory, and it doesn't easily create visual effects.

The Commitment. Should you avoid investing time in QBASIC? If you want skills highly transferable into modern programming of **graphical user interface** (**GUI**, interfaces that use icons and menus to carry out commands, open files, and select options) software learn Visual BASIC instead. Or, if you don't intend to distribute your custom program, and it concerns numbers and formulas, it's often better and more easily done in a spreadsheet. If you need elaborate flexible control of text formatting to the printer or screen, QBASIC may be too limiting and tedious. If your project is basically a database-type project, you might avoid QBASIC. You surely can write database programs in QBASIC, but compared to *Access* or *Approach* for such projects QBASIC would be extremely cumbersome and weak.

Features. QBASIC's editing and search features are the same as those in DOS' text editor, such as opening multiple files, condensing text for maximum viewing capabilities, opening files in a read-only mode, and the search and find commands. Other menus include a Debug menu for program troubleshooting and a Help menu, which provides helpful instructions for BASIC beginners and experts alike. QBASIC commands are described in plain language with sample QBASIC program lines.

An excellent reference called the "Survival Guide to QBasic" is part of the online help system. Take time to read this documentation.

The QBASIC editor also helps you avoid spelling errors by always capitalizing a BASIC command, and it also tracks variable names. If you capitalize a variable and then later decide to make it lowercase, QBASIC automatically will change each instance of the variable to lowercase.

Like GWBASIC and BASICA, QBASIC is an interpretive compiler. This is a disadvantage because this means a QBASIC program can't run without first being loaded into the QBASIC compiler. Program execution is not as fast under an interpretive compiler, and your program must work within less random-access memory (RAM).

A Little Program. To begin programming, you must first start QBASIC. Type **qbasic.exe** at the C> prompt and then press the ENTER key. If it doesn't load, you can use a few DOS commands to find it. Type the command **cd c:** to switch to the root directory in drive C:.

Next, type in the following information to begin your first shot at programming.

```
CLS
PRINT "You did it!"
PRINT
PRINT "You are now a programmer."
```

So, what exactly did you tell the computer to do? You told it to clear the screen with the CLS command and to print the text "You did it!" on the first line of the screen, a blank line on the second line, and on the third line "You are now a programmer." text using the PRINT command.

Next you will want to run your handy little program. Press ALT-R to open the Run menu and then S to invoke the Start command.

Your screen will go black and then the following will appear:

```
You did it!

You are now a programmer.
```

Take a look at the QBasic/QuickBasic Top 50 World Wide Web site to find more information on the easy-to-use *QBASIC* programming language.

To save your program, press ALT-F and then *A*. Type in a name in the File Name field and press ENTER.

BASIC Resources. Although some programmers will sneer at BASIC, there is still great interest in the language. World Wide Web sites of interest include:

- The All Basic Code Homepage at http://charlie.simplenet.com/abc/abchome.html
- Acid Works QBasic Software at http://www.pinn.net/~nunnally/qbasic
- The QBasic Station at http://www.bitsmart.com/qbstation
- QBasic.com at http://qbasic.com
- The QBasic Page at http://members.xoom.com/01236547
- QBasic/QuickBasic Top 50 at http://www.qb50.com/index.html?0001

These entries will introduce you to the joys of programming, linking you to tutorials and download sites featuring BASIC programs and shareware BASIC compilers.

QBASIC books include "QBasic by Example," by Greg Perry from Que Corp.; "Running MS-DOS QBasic," by Michael Halvorson and David Rygmyr; and "MS-DOS QBasic: Microsoft Quick Reference," by Kris Jamsa. These latter two books are from Microsoft Press. Don Inman and Bob Albrecht wrote McGraw Hill's "QBasic Made Easy," which is an older book first printed after MS-DOS 5.0's release. It should be available at your public library. ■

by Bill Hayes and Alexander Censor, M.S.

Windows 3.1

Defining The X In Windows 3.x

With each evolution of the Windows operating system and the surrounding media circus, it is easy to forget that Windows 3.1 is still chugging away. Not just Windows 3.1, but all the **operating environments** (environments in which programs run) encompassed by the term Windows 3.x. This catch-all term includes the 16-bit operating environments that preceded the release of Windows 95: Windows 3.0, 3.1, and 3.11, which is also known as Windows for Workgroups. With the release of 3.1 following closely on the heels of the buggy 3.0, most Windows 3.0 users immediately upgraded to Windows 3.1. The descriptions below explain Windows 3.1 and 3.11, the main members of the 3.x family.

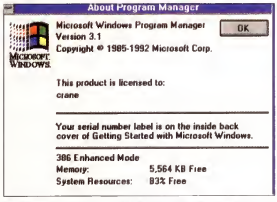
The Revolution. An operating environment differs from an operating system in that the environment cannot interface directly with your computer; it needs an operating system to perform that vital function. Windows 3.1 and 3.11 are operating environments that piggyback on the Disk Operating System (DOS) to function as an icon-driven operating system. One of the many ways in which Windows differed from DOS was its ability to share information among programs, thus eliminating time-consuming duplication. An image edited or created in the Windows Paintbrush applet could be copied and pasted into Write through a link called a **dynamic data exchange** (**DDE**, a two-way connection between programs that allows data exchange). Windows 3.x also has an even more exciting feature called **object linking and embedding** (**OLE**) that lets users go beyond copying and pasting and actually update the file everywhere it appears by changing it in one place.

Even while dependent upon DOS, Windows 3.x revolutionized the computing world. With the now-familiar graphical icons and mouse, Windows 3.x let users point and click their way through tasks instead of memorizing cumbersome DOS commands; open and run several applications at once; and actually see previews of finished pages before printing.

The Additions. Microsoft released Windows for Workgroups, also known as Windows 3.11 in 1992. It was a simple upgrade directed at the business user. The new Windows' basic tools and interface were essentially the same as that of Windows 3.1, but Windows 3.11 gave users the ability to connect to one or more computers, known as **networking**. Assuming you have all the necessary hardware (cables, connectors, network cards, and adapters), Windows 3.11 lets you share resources with one or several hundred computers in a **workgroup**. A workgroup is a group of computers connected with networking hardware and software so users working toward a common goal can share resources such as software applications and printers.

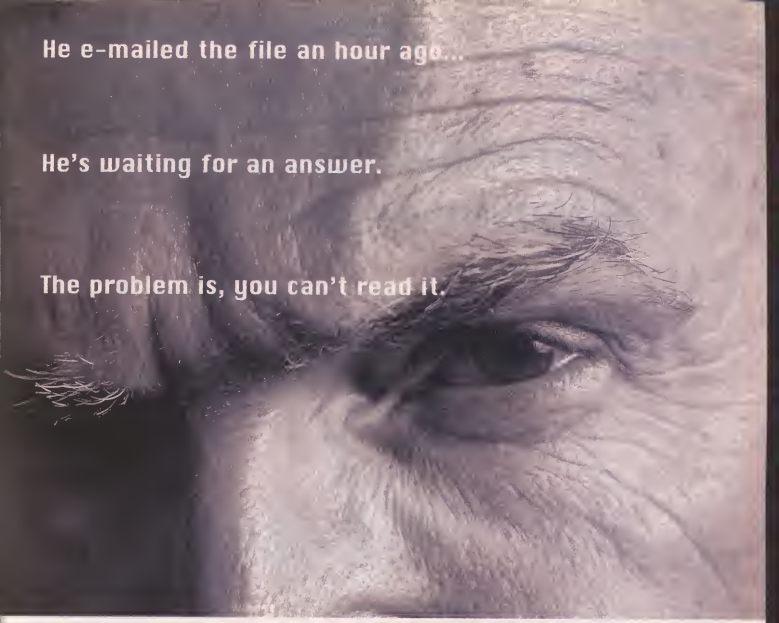
Additional features in Windows 3.11 include E-mail, Fax, Schedule+, and several new Network Applications. The Network Applications included with Windows 3.11 include Chat, Net Watcher, WinMeter, WinPopup, Log On/Off, and Network Setup. Chat allows real-time electronic communication among up to seven network users. Net Watcher is the network monitoring device, which shows who used a resource and at what time. WinMeter monitors the system itself, keeping track of the time it takes to perform various tasks. WinPopup lets users on the network send and receive instant messages that pop up on the recipient's screen. One use of this feature is to let the group know the printer is temporarily offline or that a network upgrade is going to shut down the entire system for a certain block of time. Log On/Off is how users access the shared network, a step that may or may not include a password. Network Setup is usually used by the network administrator to determine which drives, files, directories, printers, and such will be part of the shared network.

System Requirements. All the features in Windows 3.11 require a few more system resources. The system requirements differ slightly from Microsoft's recommendations. The requirements are the minimum that will support Windows, but on a PC that meets the recommendations, Windows will operate more smoothly and quickly. With Windows 3.1, you need a minimum of a 286 processor, although Windows will run very slowly. With 3.11, you will need a minimum of a 386SX processor. Both environments require DOS: Windows 3.1 requires at least DOS 3.1, and Windows 3.11 requires DOS 3.3 (DOS 6.0 or later is recommended). Windows 3.1 requires two megabytes (MB) of random-access memory (RAM), 8MB to10MB of free hard drive space, and one diskette drive. Windows 3.11 requires a minimum of 3MB RAM and will run with a minimum of 4.5MB free hard drive space, but the recommended amounts are 4MB of RAM and 9.5MB of free hard drive space. For Windows 3.11, you will also need a Class 1, Class 2, or Communications Application Specification (CAS) fax/modem to send and receive faxes. ■



Windows 3.1 and 3.11 look a lot alike, but choosing the Help menu and About Program Manager is a clear way to find out what version you are running.

by Katie Powers



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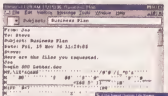

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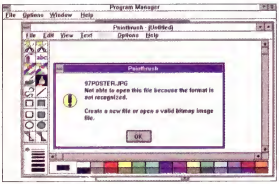
Windows 3.1 Windows 3.1 Stripped Down

Few users run their Windows 3.1 operating system with no application software installed, but let's assume for a moment that you do. What could you do with a basic, just out-of-the-box Windows 3.1 system? Well, for a bare-bones system, you can use quite a few kinds of files. A pack of standard accessories that comes with the system lets you open various word processing and graphics files. These accessories, however, can't handle every file format in their field. It's a frustrating to get excited about a great file you find online or elsewhere, only to discover your system won't open it. The following summaries explain what files Windows 3.1 can access on its own.



This error message is all you will see when trying to open a .JPG file in Paintbrush.

Paint A Picture. The Paintbrush accessory lets you create and manipulate images. As long as an image is a bit-mapped file (with the .BMP file name extension) or a PC-Paintbrush file (.PCX), you will be able to view it in Paintbrush and copy it to Write, Cardfile, and Notepad, save it as the wallpaper for your desktop, print it out, or send it by E-mail through an attachment. Paintbrush is a limited application unable to open, view, edit, or create Graphics Interchange Format (.GIF), Joint Photographic Experts Group (.JPG), or tagged image file format (.TIF) files.

That limitation means you can't handle most of the graphics found on the World Wide Web in their existing formats. Your Web browser (*Netscape Navigator* of *Microsoft Internet Explorer*), however, provides a way around the problem. Say you found a .JPG or .GIF image of a gorgeous golf course at a free photo site. Even though it's probably a .JPG image on the Web, you can access it as a .BMP file. First, right-click the image and choose the Save Image As option. In the dialog box that appears look for the Save As Type box. Click the down arrow and select Bitmap (*.bmp) to save your image as a .BMP file. To finish, click Save.

You can save the image to a diskette or to your hard drive and then open, view, and edit the image in Paintbrush. (Image quality depends, as always, on the abilities of your monitor and graphics card.)

Since we're assuming you have a browser, use it to view offline .JPG and .GIF files. Say you have a diskette with pictures or images you'd like to see, but Paintbrush won't let you open them. Put the diskette in your A: drive, open your browser, and open the File and choose Open. Select your A: drive and pick the image from the list of files.

Do Some Processing. Write is the basic word processing application that comes with Windows 3.1. Write can't do anything terribly fancy, but you will be able to change the font style and size, move the margins, cut and paste bit-mapped images into your document, and save and print your files. Documents created in *Word*, *WordPerfect*, *Word Pro*, or other word processing applications can be opened, read, and edited in Write only if they're saved as text files (.TXT). Saving in this format eliminates all character formatting (such as bold and italics) set up in the full word processing program. Windows' Notepad accessory also can open .TXT files.

Play It Again. Waveforms (.WAV) are sound clips and recordings that you can play through Windows' Sound Recorder accessory if your PC has a sound card. Hundreds of sites online offer music, sound effects, and audio clips from movies, television shows, and commercials in the .WAV format. Musical Instrument Digital Interface (MIDI) files, the instructions that tell your sound card how to create music, require additional hardware to play, but a Windows 3.1 system with the appropriate sound cards and drivers can play MIDI files using Media Player.

Assuming you have the proper hardware, Media Player also lets you play, but not create, multimedia files, which generally include graphics, video, and sound. Without an upgrade or additional software, however, you will not be able to watch a videodisc or play video clips through Media Player. With a sound card and a CD-ROM drive, you will be able to play your favorite CD in Media Player.

Zipped Away. Before you jump online and attempt to download some of the countless files available, know that many of them are **zipped**. A zipped file compresses the data, packing large files into smaller packages. Windows 3.1 alone can't **unzip** (decompress) files into a usable form. Even if a zipped package includes .BMP files that Windows can handle, they're inaccessible without special unzipping software. An exception to this rule, however, is an **executable** zipped file, which has a .EXE file extension. This kind of self-extracting file contains everything needed to unzip itself. Download the file and double-click its name in File Manager. On-screen instructions should walk you through the process of accessing the files within. If you have .PCX or .BMP files, after executing the file, simply open them in Paintbrush. If you have a .WAV file, open it in Sound Recorder.

All these Windows 3.1 limitations can get frustrating. But by using some clever tricks such as those above and by adding a few cheap software applications, you can be productive with even a basic system. ■

by Katie Powers

Windows 95

Resource Kit's Help File Treasures

If you've grown frustrated with the sometimes meager assistance offered in the Help program of Windows 95 and you're looking for more information on the operating system from the folks who created it, you're in luck. There is more free help close by; you just have to know where to look.

Those tricky Microsoft programmers included another source of help right under your nose. It's the Windows 95 (Win95) Resource Kit, and if you have your Win95 CD-ROM, you can access the kit's wealth of information with just a few mouse clicks.

Before you start, however, understand that Microsoft created the Win95 Resource Kit, according to its introduction, for "administrators and MIS professionals." In other words, some of the information here might be more technical than what you find in the standard Help file. Also, Microsoft targets some of the contents toward people trying to run Win95 on a group of networked computers, which may or may not apply to you. That said, we still think the average computer user will find some useful stuff in there, so we recommend you give it a try.

To do that, put your Win95 CD-ROM in your CD-ROM drive. The autorun function will run the disc and open the Win95 interface screen. Once it appears, select the Browse This CD button. This brings up the 95arkful window. Double-click the ADMIN folder, the RESKIT folder, the HELPFILE folder, and finally the Win95rk icon. This brings up a Help window similar to the one you see when you access Help from within Win95. It has the same three-tab setup, with tabs for Contents, Index, and Find. Our discussion focuses on the Contents tab.

The Short List. The Contents tab includes a list of major Win95 topics from which to choose. Some are worth investigating, while others you might want to skip. Reading through the information accessible through the Contents tab is the best way to gain a general knowledge of what the Resource Kit has to offer, which is why we will spend most of our time there. The other two tab options work better for finding specific areas of information; we'll cover them shortly. Incidentally, to access any of these topics double-click the book icon next to the title.

Copyright Notice. Here's a great piece of literature if you are an insomniac. It is essentially a long list of copyright and trademark information. Unless you plan on doing something illegal with Win95 (which we do not recommend) you can probably skip this section.

Welcome To Windows 95. Double-click the book icon next to this title, and a sublist appears. That list includes an introduction, a how-to-use guide, a utilities brief, and a conventions list. The introduction explains more about the Resource Kit. The how-to guide offers a brief description of the different Contents topics. The utilities list explains where to access additional Win95 utilities. The Conventions section offers a group of words, typographical symbols, and acronyms and defines what they mean. For example, "BOLD—Indicates the actual commands, words, or characters that you type in a dialog box or at the command prompt." We heartily recommend reviewing the Conventions section before you start into the rest of the Resource Kit. A few minutes here can save you plenty of confusion later.

Deployment Planning Guide. You guessed it; this section is for network folks looking for additional information on installing Win95 in computers throughout a corporation. A comprehensive Deployment Planning Basics section covers everything from an overview of the system's features to planning the actual roll-out process. A second section, Deployment Strategy And Details, offers more specific instructions on the process.

Installation. If you're running Win95, this setup information might be of little value. If you're thinking about installing the operating system on another machine, however, or re-installing it on your PC, there is some useful information in here. The section breaks down into a number segments that include one for installing Win95 on a single computer, one for

installation on a server-based network, one for custom and automated installations, and one that describes some of the more technical aspects of the installation from the setup process to troubleshooting to removing the operating system from your computer. It's a must-read section for the technically inclined. Less so for the rest of us.

Networking. If the way Win95 works as part of a network interests you, read this. From a Networking Basics section that offers the low-down on which network operating systems (NOS) Win95 plays nice with, to actual instructions for setting your system up on these various networks, this section is chock full of network goodness. If you are running a computer solo, however, you will probably want to skip to the next section.

System Management. Useful for single and networked PCs, this section covers information on software and hardware issues, Win95's built-in security protocols, remote administration, and automatic performance-enhancement features (such as memory management).

System Configuration. If you want to know how **Plug and Play** (a standard that automatically configures new hardware) works, this section offers the lowdown. It includes everything from technical explanations about the technology to step-by-step instructions for installing new hardware to enabling your portable computer's PC Card slot. There's also a comprehensive guide that offers explanations, instructions, and diagrams about Win95's plethora of multimedia features.

Communications. Win95 made some giant leaps forward in communication capabilities, and this comprehensive section outlines some of those new features. Here you can learn more about installing and using the computer's main communication tool: the modem. Once you tackle modems, check out the data on the operating system's built-in E-mail capabilities (*Microsoft Exchange*), fax software (*Microsoft Fax*), dial-up networking, and—of course—exactly how to connect to the Microsoft Network.

Windows 95 References. This section full of heady, complicated information is a techno-geek wonderland. Here you will find detailed information about topics such as Win95's architectural components (such as device drivers and the file system), its virtual machine manager, and its user interface. There is also a sizable section on Win95's Registry, the "central information database" of the operating system. Fun o'plenty.

Appendixes. Just in case you have not found enough technical information in the rest of the kit, Microsoft's techies throw together one last section to make sure they address areas such as command lines, device information files, shortcuts, and accessibility. If you cannot find it anywhere else, it's probably here.

Finding What You Need.

If you have some idea of what you're looking for and don't want to trifle with the neatly organized Contents tab, you can try the Index tab. Here you will find an exhaustive listing of topics in alphabetical order. To speed your search of this list you can type in words or phrases, and the program will try to match them to existing help topics. Once you find the topic you want, highlight it and click the Display button.

If you would rather not read about your operating system under the Contents tab or scan through lists of possible help topics under the Index, you will want to skip straight to Find. The first time you do this a Find Setup Wizard will appear; you must complete this wizard before you can use Find. It sets up the necessary searchable database, but before it can do that you must select a type of database: minimized, maximized, or custom.

Win95 recommends the minimal-sized database (probably because it takes up the least space). The maximum size is a more complete, and more time-consuming search, and the custom selection let you select the exact find features you want to include. The minimized selection should do the trick for most users. Once you select which type you want, the operating system will take a few moments to create the database.

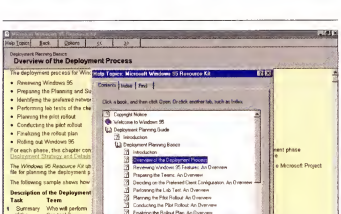
Once the database is complete you can begin your search. The Find feature operates in three ways. In the first, you simply type in a word and it attempts to find a match. If that does not bring about a perfect match the program offers words or phrases that come close. From here you can select a word or phrase, or you can move to the third option, which is a list of topics. Using the find features takes some practice, but if a topic exists in the Win95 Resource Kit, you should be able to find it here.

Like It? Keep It.

If you grow attached to the information the Win95 Resource Kit offers, but you are ready to get that CD-ROM out of your drive, transfer the data to your hard drive for easier access. To do this, copy the Win95rk.hlp file and the Win95rk.cnt file (also located in the HELPFILE folder) to your C:\WINDOWS\HELP folder. One way to do this is to keep your Resource Kit's HELPFILE open and then access your regular HELP folder in WINDOWS though the C: Drive in the My Computer icon on the Desktop. Then you just drag the two folders from the HELPFILE folder over to the HELP folder to copy them.

Now that the information is on your hard drive, the easiest way to access it is through a Win95 shortcut. To create a shortcut to the Win95rk.hlp file right-click your Desktop, select New, then Shortcut. Type in the command line (it should be C:\WINDOWS\HELP\Win95rk.hlp) or use the Browse button to find the file then click the Next button. Type a name for the shortcut and click Finish. The new shortcut should appear on your Desktop, and from now on you will have quick and easy access to your new favorite help file. ■

by Tom Mainelli



The Windows 95 Resource Kit offers plenty of topics; using the Contents tab is the best way to obtain a wide overview of what the kit contains.

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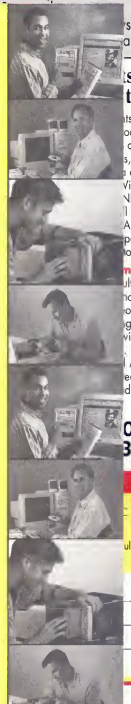

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Basic Training

Regardless of the operating system you choose, there are a few elementary functions you should understand. This section is your one-stop guide to learning these crucial first steps in DOS, Windows 3.1, and Windows 95. Use it to learn your operating system and see whether others offer a smarter way to work.

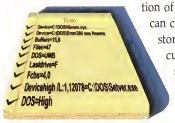
THE STARTUP PROCESS

Every time you start your computer, not only must it endure a shock of power similar to you stepping on a rugless floor in January, it must peruse its "To Do" list, ensure it has all the resources, and generally put itself in order to do some work. This is a review of what actually happens every time you start your computer provides a look at several key components and files.

When you first push the power button an electric charge from the power supply travels through the PC to fire up the central processing unit (CPU). The CPU starts the **read-only memory Basic Input/Output System (ROM BIOS)**, which begins the **Power On Self Test (POST**, a set of tests performed by a computer during its startup routine to make sure all its components are working correctly). During the POST the system quickly checks items such as random-access memory (RAM), internal drives, the keyboard, the monitor, and other important parts. (The ROM BIOS automatically controls the computer's startup functions, such as the keyboard, display, and disk drives, and can be erased and rewritten if the user needs to update the BIOS program.)

Once the system completes the POST, it starts looking for the PC's **operating system**, which is the software that controls the computer and its peripherals and basically tells it how to do things. The PC always checks for the operating system first on the diskette drive. This process makes it possible to use a **boot diskette** to start your PC when the hard drive is malfunctioning. If the operating system isn't located on a diskette in the diskette drive, the PC finds it on the hard drive and then begins the boot-up process. DOS, Windows 3.1, and Windows 95 (Win95) then thumb through files stored in the Configuration system (Config.sys) file and Automatically executed batch file (Autoexec.bat) to obtain information on your system's configuration. Windows 3.1 and Win95 also refer to their **initialization files (.INI)**, which hold information about specific options in your setup.

SYSTEM FILES



Each operating system has its own variation of system files it uses at startup. You can change the way these file collections store and execute data. If you want to customize the way your computer starts up, however, you must be careful and know the role of each startup file in your operating system. Before you tamper with any startup file, copy it onto a diskette so you can restore the original settings in case you make a mistake. Also keep in mind that your computer reads the system files only as it starts up, so you must restart your computer for any changes to take effect.

MS-DOS 6.22

This venerable operating system has shown its face with less frequency as time has passed, but DOS still lies somewhere beneath all the more common operating systems (Windows). Every time you restart your computer, your screen flashes, and as the computer goes to work, you'll see a DOS screen scrolling through numbers and words in order to tell your memory, device drivers, and peripherals such as your keyboard, mouse, and multimedia devices what to do.

It all begins with **Config.sys**. The primary functions of Config.sys, are to jog your PC's memory, make a list of chores for your **device drivers** (programs that let hardware peripherals, known as devices, communicate with a computer's operating system), and tell your PC how to act during the course of the work session.

Config.sys dwells within your main directory, most frequently the C: drive on your PC. The contents of Config.sys will differ among computers. This isn't necessarily because Config.sys mutates or changes according to the situation; if you want to make any changes, you have to do them yourself. The differences stem from the fact that almost all computers are created differently, even if the differences lie in just a couple of command lines.

Every Config.sys has to perform certain tasks, however. Every time a PC checks Config.sys, it reads a series of command lines. To peruse your PC's Config.sys lines, type **config.sys** at the C> prompt. The contents of the file may be many or few. Whatever the case, your list always controls the device drivers (which are Himem.sys, Emm386.exe, and usually Setver.exe) the buffers, the files, the shell, and stacks.

Himem.sys, a command line that didn't show up until DOS version 5, takes care of your PC's memory—one of the most essential components in determining your computer's performance. It allows **extended memory** (all memory above the first megabyte) to be used, which frees up space in conventional memory for programs to use.

Emm386.exe takes care of your PC's expanded memory, which is the amount of memory past the first 640 kilobytes. **Expanded memory** is also known as the upper memory area; it is used to hold programs and device drives that otherwise use up conventional memory space. It is used on computers with 386 or higher CPUs. All you have to keep in mind is that both Himem.sys and Emm386.exe make more efficient use of your PC's memory.

Setver.exe keeps track of all programs on your PC, as well as their version numbers. If your PC doesn't recognize one of your programs at start up, Setver.exe steps in and "verifies" the program is legit.

Buffers are temporary storage areas for a computer's memory, usually in RAM. They hold recent changes to files and other information to be written later to the hard drive.

Files is a special memory area reserved for **file handles** (the names the computer uses to refer to the files it is using). The number of files a computer can open at one time is directly proportional to the number of file handles it can fit in the special memory area reserved for that purpose.

The **shell** provides an interface between the program and the user, and **stacks** are set aside as memory areas for hardware devices.

Config.sys is essential to your computer's well being. If one of its primary files is missing or defunct, your system will not run to its full potential.

Another important file is **Autoexec.bat**, a special **batch file** placed in the system's root directory that is automatically executed each time the computer starts. (A batch file is a file that contains a list of instructions carried out in sequential order.) This file is a simple list of statements designed to run programs or configure software and hardware so the computer will properly operate. This means that any commands or programs in the file will also run at startup.

The most important commands in Autoexec.bat are the ones that set up your operating environment. Without them, you would have to manually execute each startup command and program. Typically Autoexec.bat includes:

- **@Echo Off**, which allows DOS to only show vital information on the screen while running the rest of the commands in the file.
- **Prompt**, which tells DOS what you want your prompt to be (for example, Prompt PG shows the current drive and directory).
- **Path**, which tells DOS where to begin looking for programs it can't find in its current directory.
- **Set**, which tells DOS what directories certain files should be stored in.

Windows 3.1

This operating environment requires the same files as DOS for proper startup and file execution. Windows also requires the .INI files, which keep track of all files and their extensions, along with information about your system's configuration. Some of the required files include Win.ini, System.ini, Progman.ini, and Control.ini.

Win.ini is the mothership for Windows 3.1, setting and protecting the preferences and default program settings such as those for your Desktop, file extensions, fonts, and usability features—this includes your desktop wallpaper, display colors, font sizes, screen savers, and sounds. Almost all installations of Windows 3.1 have the same contents in Win.ini. Usually the major settings don't need to be changed after they are created on your system by a programmer or developer. These settings can be changed, however, to match your preferences.

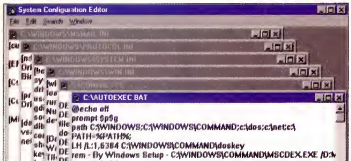
System.ini, as the name conveys, baby-sits your system and all its hardware. This file is crucial to your computer's performance. In most cases, when you add or remove a hardware device, you have to reboot the PC so Windows 3.1 can configure and incorporate the new hardware profile and settings. Here, you can also set your **port** (a device that allows access in and out of the computer for cables) and **interrupt request lines** (**IRQ**, communications routes within a computer reserved for carrying interrupt signals, which tell the CPU to halt its current task and await further instructions) settings and new device drivers.

Progman.ini could be considered Windows 3.1's most frequent flier. Program Manager, true to its moniker, oversees how programs work together and execute commands on your computer. Whenever you add or remove a program, Progman.ini is there to keep things in line. Furthermore, every time you launch a program, Progman.ini tells your system what to do and how to do it. Usually, Program Manager takes care of itself; you will rarely have to edit this file.

Control.ini keeps tabs on all the things you've used to soup-up your computer. For instance, Control.ini saves your preferred settings for sound events, graphics cards, Musical Instrument Digital Interface (MIDI) files, and desktop colors, patterns, and of course, wallpaper.

Windows 95

The **Registry** in Win95 can be thought of as a giant apartment complex, where DOS, Windows 3.1, and Win95 cohabitate. In a sense, when you reboot these operating systems embark on a voyage together. Win95, although fairly independent from DOS and Windows 3.1, requires Autoexec.bat, Config.sys, Win.ini, System.ini, and any other .INI files in order to "get along" with its roommates. Of course, being the



In Windows 95 (pictured) and 3.1, you can change or just peruse your system files in the System Configuration Editor.

more evolved of the roommates, Win95 overwrites a few of the old DOS and Windows 3.1 options and inserts its own settings. This mainly happens when Win95 automatically incorporates certain devices, such as CD-ROM drives, which require additional command lines and/or additional peripherals to perform certain tasks.

When you look at the Desktop and all its icons, you're viewing the Registry's facade. To take a peek inside, simply right-click a icon, and select Properties; usually this tells you about the basic function of a certain program or application.

FILE EXTENSIONS

DOS, Windows 3.1, and Win95 all use **file extensions** (usually presented after a file name and a period, as a three-letter abbreviation for a certain type of file). The extensions tell the computer a file's purpose, usually by indicating which file belongs to which program. If you're viewing a directory's contents and double-clicking a data file associated with an application, the operating system knows to open the application and then the document within it. The file extensions also help you quickly spot types of files while you're scanning the files on your system. If the file itself is an application, the operating system will automatically launch it when it is opened. Basically, file extensions are the "dog tags" for your computer's files; if you can't find a file, you can click the Start button in Win95, then Find, Files And Folder, and using the Of Type field under the Advanced tab, you can type in a certain file extension for which you want to search.

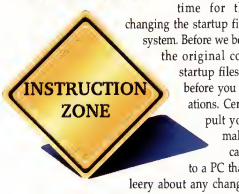
Here are some common file extensions:

- .BAT—A batch file
- .COM—A command file
- .DAT—A data file
- .DEV—A file used for a device driver
- .EXE—An executable program
- .INI—A startup file for the operating system
- .SYS—A System file (related to hardware)
- .TMP—A temporary file

The role of file extensions changed with the introduction of Win95. The association became separate from the file extension, and periods became acceptable as a part of the file name. Before, a period separated the file extension from the file name because of the old **eight-dot-three** DOS rule, which dictated that file names could consist of up to eight characters and a three-character extension separated by a period.

Win95 also requires these file extensions to navigate the Registry. The most common file extensions used in Win95 are .EXE (a file that runs an application), .COM (a file that give instructions in the form of commands to the computer), .DOC (a text document usually created by *Microsoft Word*, but also available in the WordPad accessory), and .TXT (a text file). These help Win95 find pertinent files in its Registry, and they help you determine whether they are essential to your computing experience.

INSTRUCTION ZONE



Now that you know the basics, it's time for the actual work of changing the startup files for your operating system. Before we begin, remember to save the original configuration of your startup files on a backup diskette before you make any major alterations. Certain changes can catapult your system into major malfunctions, from applications that won't work to a PC that won't boot at all. Be leery about any changes you make, and be sure to consult your manual or contact the manufacturer if you have any doubts.

If you're using Windows 3.1 or Win95, there are two ways to edit your system files. You can open MS-DOS and work through typed command lines. In Windows 3.1, go to Program Manager, double-click the Main icon, and then double-click the MS-DOS Prompt icon. In Win95, open DOS by clicking the Start menu, Programs, and then MS-DOS Prompt. Another route is using the SYSEDIT command to access your files within Windows. In Windows 3.1, open Program Manager's File menu and choose Run. Type **sysedit**. Your system files will open in windows on the Desktop. In Win95, click Start, choose Run, and type **sysedit**.

Autoexec.bat. Inside DOS, you must complete changes to Autoexec.bat one step at a time; this means you should save and reboot after every change you make, to ensure you don't

scrap the entire batch file. Here, some of the simplest changes involve alterations such as the time and date and the prompt's appearance (if you make any changes at all).

Type **cd c:** and press ENTER. Then type, **prompt pg** at the C> prompt to display the current drive letter and the directory name. To make the prompt display the current time or date, type **prompt $D** or **prompt $T**, respectively. Or even better, to make the prompt say something like "Aloha," type **prompt aloha** at the C> prompt. To make these changes permanent, add the lines to your Autoexec.bat file. Type **edit autoexec.bat** to access the file. Then find your existing PROMPT line and replace it with the new command. Save the file by pressing ALT-F and choosing Save. Then press ALT-F and choose exit, then reboot the PC. Your new prompt should appear on the screen, indicating that you've successfully edited an Autoexec.bat file!

.INI files. One of the things you may have to do in an .INI files is restrict users' activity in Program Manager in Windows 3.1. With a few simple additions to Progman.ini, you can prevent users from changing Program Manger's configurations. All you have to do is insert a few new lines in the [restrictions] section. (You may have to add [restrictions] if it isn't there.) These are some of the stipulations you can add as keynames and values:

- **NoRun=1** (This entry disables the Run command in Program Manager.)
- **NoClose=1** (This disables the Exit Windows command.)
- **NoSaveSetting=2** (This disables the Save Setting command in Program Manager.)
- **NoFileMenu=1** (This removes the File menu from Program Manager.)

Making changes to .INI files and the Registry pretty much go hand-in-hand. However, a few differences exist between the system files in Windows 3.1 and Win95. Basically, Win95 has a faster, more efficient interface, with a hierarchy of folders and directories that manage programs and files. All configuration information is stored in the Registry with Win95; in Windows 3.1, most things are stored in Win.ini, System.ini, and the other .INI files. Of course Win95 still maintains the .INI files, but they aren't essential to making changes in the Registry.

Registry. Thanks to Win95 developers, editing the Registry is as easy as clicking an icon, accessing its subfiles and subfolders, and making changes from there. Any major changes to the Registry require technical changes, usually made when nothing else works.

Most technical changes can be made in the Control Panel. These include adding and removing programs; tweaking date and time settings; changing the Desktop, fonts, and wallpaper; altering Internet and modem settings; customizing the keyboard and mouse; using mail; and configuring other peripherals such as multimedia devices, graphics card, ports, and printers.

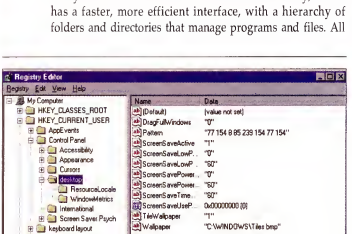
For example, if you want to change the date and time settings on your PC, click the Start button, go to Settings, then select Control Panel. The Control Panel window will open, displaying icons and descriptions for all the settings you can change. Click the Date/Time icon to open the Date/Time Properties box. Here you can change the date and time by using your mouse; or, click the Time Zone tab and click the area of the map where you live to change the time zone setting. Click the OK button to save your changes.

However, if you need to get into the Registry yourself, run the registry editor program (Regedit.exe). Click the Start button, then Run. Type **regedit.exe** and press ENTER. The registry holds six folders, each named with a **Handle To A Key (HKEY) prefix**. These six folders control the basics of your computer.

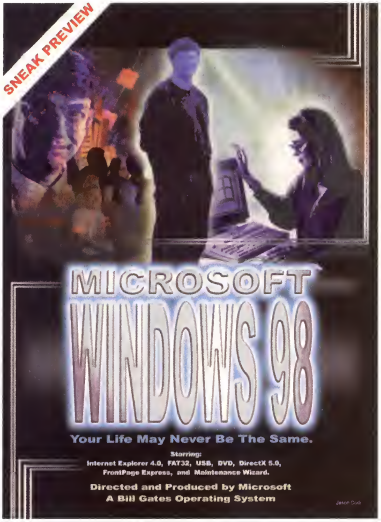
- **HKEY_CLASSES_ROOT** features file associations and extensions, as well as software classes and specifications.
- **HKEY_CURRENT_USER** showcases user names, passwords, Desktop and networking preferences, and other customizations.
- **HKEY-USERS** also stores important user information.
- **HKEY-LOCAL-MACHINE** controls, and contains information on, the hardware, device driver, software, and peripheral settings. Whenever you install or upgrade programs, this is where the information takes root.
- **HKEY-CURRENT-CONFIGURATION** contains and maintains the current display settings, such as wallpaper, Desktop themes, fonts, colors, date and time, and other minor interface preferences.
- **HKEY-DYN-DATA** manages current user and performance statistics—in other words, data.

Once again, if you need to make any changes to these folders, it is best to consult the manufacturer or a professional computer programmer or developer. ■

by Kay Prauner



Editing the Registry involves clicking an icon, accessing its subfiles and subfolders, and making changes from there.



15 Top New Features In Windows 98

Your idea of an improved operating system may be one that finishes your financial reports for you, makes perfect coffee, compliments you on your fine typing skills, and—most amazing of all—never crashes. Win98 is not that operating system, but it is faster, more powerful, and easier to use than previous Windows versions. When designing Windows 98 (Win98), Microsoft took a close look at Windows 95 (Win95), and made many significant improvements.

Kim Aker, Microsoft's product manager for Windows, says Microsoft focused on three main areas of improvement when developing Win98: improved ease of use through Internet integration, increased performance and reliability, and enabling new hardware and entertainment capabilities. The following is a look at these areas and the top 15 changes and improvements that make Win98 a better operating system.

It's the Internet, Stupid! Saying Microsoft emphasizes the Internet in Win98 is like saying Microsoft emphasizes text in *Word*. World Wide Web browser-style interface and functionality permeate the new Windows. "There are several technologies of the Internet that people have found really useful . . . for example, the navigational paradigm—the backwards and forwards buttons—that's something that people really like," Aker says. Microsoft also threw in a few programs to help you create and maintain a home page and obtain help online.

1 Internet Integration

The first and most obvious change is in how you navigate Windows. The windows in the operating system look and function like *Microsoft Internet Explorer 4.0*. You will see forward and back buttons, an address bar into which you can type the name and path of a file, and even a Favorites button, so you can bookmark your most commonly used files.

Advantages to the new design include the fact that users will find information on their hard drives or networks in the same way they find information on the Internet, which simplifies retrieval and builds all work around one set of skills. The process is the same whether you're looking for a Web page or a Word document.

Another browser-like Win98 feature eliminates an annoying Win95 situation. When you access a file or folder through My Computer in Win95, you can end up with several open windows on your Desktop. That's not the case in Win98; only one window is open, but the view changes whenever you open a new folder.

Microsoft did not stop at making Win98 look more like a Web browser: It acts like it, too. Win98 provides several ways to access the Internet quickly and easily. You won't have to open your browser anymore. For example, you can place an address bar in your Taskbar at the bottom of your screen. Just type in a **Universal Resource Locator (URL**, a site's address), and you're on your way to that site. You also can type a URL in the address bar of an open window in My Computer. For more information on learning the interface, see "A Look At Windows 98" in this issue.

2 Windows Update

The new look and feel of Win98 make computing easier, but some bugs are bound to pop up eventually. You won't have to worry about buying a "fix-it" kit, however, because Micro-soft has an update area on its Web site.

Windows now resemble Internet browsers, making it easier to navigate through your files and folders.

Use the Personal Web Server to host a World Wide Web site.

Here you will find the latest software patches and updates for Win98, as well as the latest device drivers for new hardware as it becomes available.

The great thing about the Update Manager is it keeps track of which updates you install to your operating system. Your system's "profile" is stored locally on your computer. When you access the Update site, the Update Manager compares the installed updates to all the updates available in the database. It then informs you of updates you have not installed and asks whether you want to install any of them. If you need to remove an update for some reason, the Update Manager includes a Restore option that lets you remove any of the updates you installed. Just highlight the one you want to remove in the Update Manager and click the Restore button.

3 Create A Web Page

Win98 includes a few programs that will help you create and maintain a Web page. For example, *FrontPage Express*, which you can access from the Win98 installation CD-ROM, includes several templates and a couple of wizards that will help you design a Web page. FrontPage Express tries to make the design process as painless as possible for new Web designers.

Once you complete your Web page design, you need to put it somewhere. You can use the included Personal Web Server program to turn your PC into a low-end **server** that makes your Web page available to 'Net users. The Web Publishing Wizard provides support for all the major Internet protocols, such as **File Transfer Protocol** (**FTP**, a standard way to transfer files between computers) and the familiar **Hypertext Transfer Protocol** (**HTTP**, the set of standards that lets Web users exchange information found in Web pages).

A couple of other Internet programs take Win98 to the realm of online multimedia and conferencing. *Microsoft NetShow* plays **streaming** multimedia over the Internet or through a local-area network (LAN) connection. (Streaming is a type of data transmission that can be continuously processed for a smooth audio or video connection.) *Microsoft NetMeeting 2.0*, which allows online conferencing including videoconferencing, also shows up in Win98.

4 Broadcasting Online

Videoconferencing is just the beginning of your online video experience in Win98. The new operating system includes broadcast architecture that lets you watch television over the Internet if you have a TV tuner card with a TV cable attached. You will be able to watch television and have access to enhanced online information related to the program, very similar to what you receive with **WebTV**, a device that supports Web browsing on a television.

Aker says most networks and cable stations use two major standards to deliver their Internet broadcasts. They are Vertical Blanking Interval (VBI) and Intel's Intercast Technology. These two technologies are capable of delivering the video programs and the enhanced Internet content simultaneously. The advantage of this is

you receive the 'Net information through the TV cable and video signal, so you don't have to use your phone line.

The Proof Is In The Performance.

The emphasis on 'Net functionality and flexibility is great, but Microsoft feels the need for speed like everybody else. That's why it popped the hood on Win95 and found new ways to improve system performance in Win98. Now, computing is not only easier, but faster. (You don't even have to buy a new CPU.) Microsoft also figured out new ways to create more space on your hard drive, so you can store even *more* information on that new six gigabyte (GB) hard drive. Several new utilities for easy maintenance and diagnostic tasks are also at your disposal.

5 Faster System Startup

Wouldn't it be nice if starting up your PC was as quick and efficient as turning on your television? Well, we're not quite there yet, but we're getting closer. When you turn on your computer, it must load the **Basic Input/Output System** (**BIOS**), which is information essential to operating your computer. Then, the PC loads the operating system. Aker says this process could take up to a minute—30 seconds each for the BIOS and the operating system. With Win98 and a new and improved BIOS called Fast Boot BIOS, you can cut that time down to three to six seconds.

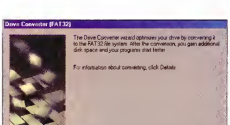
Win95 takes so long to load up because the BIOS and operating system spend a lot of time making sure the other is loading properly. In Win98, the BIOS and the operating system still communicate, but there's a lot less chatter. That's because Win98 and the new Fast Boot BIOS signal each other with **flags**. (Flags are bits of information with two possible states, which can be thought of as "on" or "off.") If the BIOS loads properly, it raises a flag that signals everything is ready. The operating system notes the flag and wastes no more time communicating with the BIOS. The operating system also raises a flag when it loads properly, so the BIOS knows there are no problems. These flags stay in place, and the BIOS and operating system each assume the other is working properly unless some sort of startup error occurs.

To take advantage of this, however, you must upgrade your BIOS. The upgrade will probably consist of nothing more than downloading an upgrade from your BIOS manufacturer. The faster startup time will certainly make up for the time you spend obtaining the upgrade.

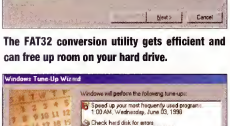
6 Faster Application Startup

Applications usually don't take long to load, but because the different files a program needs to start up are scattered throughout the hard drive, they still can take several seconds. The physical distance between the areas where the different files are stored can increase the time it takes for an application to start.

Win98 solves this problem by monitoring which applications you use most. Then it moves the files those applications need as close together as possible. That way, your system doesn't have to jump around your hard drive to



The FAT32 conversion utility gets efficient and can free up room on your hard drive.



The Maintenance Wizard will keep your PC running smoothly with automatic fixes.

obtain the files it needs. Win98 does not move the files automatically, however; you have to tell it where to move them. Win98's Maintenance Wizard utility makes the process simple. When you run the Maintenance Wizard, it defragments your hard drive and efficiently rearranges the files. Aker says this increases application startup times by about 30%.

7 Faster System Shutdown

What starts up must shut down. Microsoft decided to speed up this process also, so you don't have to stare at your PC for several minutes while it prepares itself for shutdown. Win95, for example, goes through many checks when it shuts down to make sure it won't cause **network** problems. (Networks are the main cause of lengthy shutdown times.) In Win98, Microsoft streamlined this process like it streamlined the startup process. "We're a lot smarter about which checks we actually have to do and which ones we don't," Aker says. She estimates Win98 shuts down about two to five times faster than Win95.

8 Loaded, But Not Loaded Down

Win98 speeds up many of the processes involved in computing by more efficiently handling tasks. This is especially the case when you're running multiple applications in Win98. At these times your system has less and less available **random-access memory** (**RAM**), where information necessary for an open application is stored and accessed. If there is not enough RAM available, your system will compensate by creating a **swap file**, meaning your system will reserve space on your hard drive to serve the same functions as RAM. Information is then sorted and retrieved from the swap file.

The problem with this is it takes considerably longer to transfer data using a swap file than using your system's physical RAM. Win98 is designed to handle multiple applications more efficiently, so your system can handle more applications without resorting to a swap file.

9 The Skinny On FAT32

Win98's improvements to the File Allocation Table (FAT) are some of its best new features. Not only does the new FAT32 file system free you from **partitioning** hard drives larger than 2GB (breaking them into several smaller segments), it lets you pack more data in smaller spaces on your hard drive, which will provide more free space.

Win95 used FAT16, which might store files and programs in increments of 16 kilobyte (KB) clusters on a particular system. If you had a 3KB file, you would have to store it in a 16KB cluster, meaning you waste 13KB of hard drive space. Such waste adds up quickly. FAT32, on the other hand, can store files and programs in smaller clusters. That 3KB file will fit nicely into a 4KB cluster allowed by FAT32, and you lose 1KB of free space instead of 13KB. You will probably need to convert your hard drive from FAT16 to FAT32, unless you purchase a new system that already has Win98 installed. Aker says when she converted her hard drive

from FAT16 to FAT32, the free space on her hard drive increased from 20 megabytes (MB) to approximately 200MB.

10 Maintenance Wizard

The Maintenance Wizard is an important part of Win98. When you run the Maintenance Wizard, it will search your hard drive for unnecessary files that you can (and should) delete. It will also scan the hard drive for errors and **defragment** the drive (placing related information close together). You can run the Maintenance Wizard manually or schedule it to run at various times, such as early in the morning, early afternoon, or late at night—whenever you won't need to use your computer. Running the Maintenance Wizard on a regular basis will help ensure Win98 stays in top condition.

11 Virtual Tool Chest

Several other utilities and tools are also available that will make computing better and help protect your system and your data. You will find some familiar things here, such as Backup and ScanDisk, but there are a few new items as well. One of the most important is the Registry Checker.

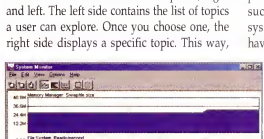
In Win95, if something went wrong with the **Registry**, which stores critical system information, the system was likely to suffer some major problems and could even be rendered unusable. You probably couldn't fix the problem, which meant your only option was reinstalling Windows. There is hardly a more unpleasant situation in computing. Win98's Registry Checker can spare you that pain. It saves the last five days' worth of Registry settings. If something goes wrong with the Registry, you can revert to a previous Registry setting.

Some other useful tools in Win98 include the System File Checker, which can restore corrupted files in your operating system; System Information, which contains detailed information about how your system is configured; and System Monitor, which keeps track of system performance.

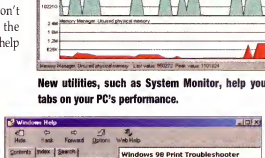
12 Help Yourself

Operating systems are becoming easier to use, and hardware and software are easier to install, but most users still will need a little guidance from time to time. Microsoft punched up the Help capabilities in Win98, making it easier to look for information.

The first step was a redesign of the Help window. It now consists of two panes, right and left. The left side contains the list of topics a user can explore. Once you choose one, the right side displays a specific topic. This way, you always have the list of topics at your disposal. "One of the things we found," Aker says "is often they (the users) don't know exactly the word or the topic that they should be looking at." With the two-pane window design, users can explore different topics without having to flip between a bunch of windows. And they won't have to start from scratch if they discover they're on the wrong path.



New utilities, such as System Monitor, help you keep tabs on your PC's performance.



The Help Menu has a new look and feel and includes 15 Troubleshooting Wizards for common problems.

Microsoft also included several troubleshooting wizards in Help. They will help solve problems related to common issues such as installing printers or connecting to the 'Net.

Wired & Ready. Since Win95's arrival, there have been many advances in computer hardware and software. Win98 is optimized to take advantage of all the latest hardware standards and powerful multimedia experience.

13 Standard Issue

One of the most exciting things Win98 delivers is true **Universal Serial Bus (USB)** support. USB lets users plug a piece of hardware, such as a scanner, into a USB port on their system and use it immediately. Users won't have to configure anything or restart their PCs.

Win95 had some initial USB support, but it was limited because Win95 lacked many of the drivers needed for true USB functionality. Aker says if you have a USB machine, Win98 is a necessity. "All of a sudden, installing hardware has become very easy to do," she says.

Win98 also supports Digital Video Disc (DVD), Advanced Graphics Port (AGP), and a new standard called IEEE 1394. 1394 is basically a better, faster type of parallel port. The extensive support of these standards means your Win98 system should be compatible with any PC hardware you can buy.

14 More Monitors, Please

Win98's flexibility doesn't end with a fistful of standards. One Win98 system now can run up to nine (yes, nine) monitors simultaneously. You could be watching stock tickers on one monitor, participating in a videoconference call on another, working on a word processor document on a third, and watching television on a fourth (in case the other three start to bore you).

15 Mighty Multimedia

It's obvious by now that Microsoft hasn't overlooked the importance of multimedia in its new operating system. Thus, Microsoft includes the latest version of its DirectX drivers—version 5.0. DirectX drivers, such as Direct3D, DirectDraw, and DirectSound, can deliver high-quality graphics and sound. The DirectX drivers are widely supported throughout the computing industry, which means that almost all multimedia hardware and software should be compatible with them.

When Win95 came out a few years ago, we were really excited. It looked so much different, and was so much easier to use, than Windows 3.x. The changes between Win95 and Win98 aren't quite as dramatic, but the improvements are excellent. You'll find the new Windows is definitely worth a look. ■

by Michael Sweet

Windows 98 For Free?

Not Exactly, But You Can Add Many Of Its Parts Without A Full Upgrade

By now Windows 98, Microsoft's new operating system, should be on sale in retail stores, assuming, of course, that it has made its way through the federal government gauntlet. But before you shell out around $100 for this upgrade, you should know just what you're getting. Many of the features Microsoft is touting as "new" actually can be added to Windows 95 (if they're not already there). On the other hand, Windows 98 (Win98) has some unique attributes and others that may be more difficult to obtain than by simply buying the upgrade. Here's the rundown on what you can get without upgrading, and where to find the available freebies.

Internet Explorer 4.0. As you probably know, Microsoft's new World Wide Web browser version, *Internet Explorer 4.0*, is an integral part of Win98. If you load Explorer 4.0 on your current PC, you will have access to many of Win98's most obvious features. This new browser does not just change the way you browse the Web (although there are numerous advancements in that), it changes the way you access your entire PC. Explorer 4.0 is available as a free download from http://www.microsoft.com/ie/ie40. (*NOTE: Microsoft also will ship a version of Win98 with the 3.0 version of Explorer for those users who do not want the new browser's far-reaching interface.*)

Active Desktop. Explorer 4.0 and Win98 make your Desktop **active**. Basically, this means you can put Web pages or parts of Web pages, such as hyperlinks and **Java applets** (small programs that run on Web pages), on the Desktop. If you have a constant 'Net connection (usually found through a corporate network), you might throw a continually updated stock ticker on your "live" background.

Web view. With Explorer 4.0, your PC's folders adapt a new Web page-like form. You can maneuver with Back and Forward buttons, just like in a browser, and embed Web content in any folder. With Web view on, a single mouse-click opens a file or folder. Resting the mouse cursor on an icon performs the same action as a click in Win95 (highlighting and displaying information about the file or folder).

Access the Web. The entire system is your now your browser. Just type a Web site location in the Address text field of an open folder or the text field in your Taskbar, and the site will open. A constant 'Net connection is most convenient since there's no wait while your PC dials up the Internet.

Software updates. One of Win98's coolest attributes is its ability to scan your hard drive and tell you what software updates you can automatically download and install. Explorer 4.0 offers this Windows Update feature in limited. Select Product Updates from Explorer's Help menu, and the browser will open the Internet Explorer 4.0 Component Download page (http://www.microsoft.com/ie/ie40/download/rtw/x86/en/download/addon95.htm). This site will scan your system (with your permission) and determine which Explorer components (but not other applications) are missing from your system and which ones have upgrades available. After you choose one or more, your PC will automatically download and install them.

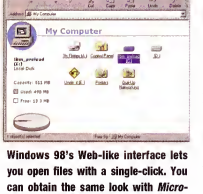
Faster load time. When Win98 **defragments** your hard drive (puts related information together), it reorganizes data so that your more commonly used applications load up faster than they did in Win95. You can't do this without Win98, but you can take advantage of Explorer 4.0's Quick Launch toolbar to get one-click access to programs and data without creating a pack of Desktop shortcut icons.

The default applications included on the Quick Launch toolbar are Explorer 4.0, *Outlook Express*, the Channel Viewer, and Desktop controls, but you can add any files or applications by dragging and dropping them to the Quick

Launch area. To remove any icon, right-click it and select Delete from the pop-up menu. To toggle Quick Launch on and off, right-click the Taskbar and select Quick Launch from the Toolbars submenu.

Outlook Express, Microsoft's advanced version of its mail and newsgroup application (or **client**), ships with Win98, but comes standard with Explorer 4.0 as well.

Service Release. Service releases are updates to the Win95 operating system that provide new and improved features you'll find in Win98. You may already have a version of Win95 with a later service release. To check which version you're running, click the Start button, select Settings, and then Control Panel. Double-click the System icon (or single-click it if you are using Explorer 4.0's Web view!) and select the General Tab. (You also can right-click the My Computer icon and select Properties from the pop-up menu.)



Windows 98's Web-like interface lets you open files with a single-click. You can obtain the same look with *Microsoft Internet Explorer 4.0*.

If the version number under Microsoft Windows 95 is 4.00.950, then it is the original Win95. If it has an "a" after the string of numbers, it is Win95 with Service Pack 1 installed. If it has a "b" after the string, it is Win95 with OEM Service Release 2.

Service Pack 1. If you need Microsoft's first Service Pack, you can obtain the entire pack as a free download at http://www.microsoft.com/windows/downloads/contents/Updates/W955vcPack1. The kit contains basic improvements to the Win95 system, updates the Win95 password list for heightened security, and contains some added hardware support with a printer port update. To install the pack, just download it and run the executable file. It will do the rest.

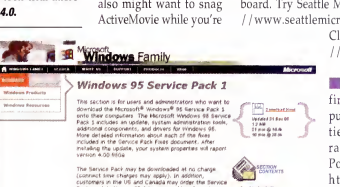
You also can find other useful utilities at http://www.microsoft.com/windows95/info/otherutils.htm, including some diagnostic and recovery applications. As you add these updates, you can keep track of them with the Update Information Tool found in Win95's Windows folder (just double-click Qfecheck.exe).

OEM Service Release 2. The OEM Service Release 2 is more complex. If your PC was purchased after fall of 1996, it is likely that you have many of this release's features already installed. But if you don't, some of these pieces are a bit harder to come by because of the changes this release makes to the way your PC stores files, Microsoft has made it available (in its complete form) only to computer manufacturers for installation on new machines.

You can visit the following site for more information about this release and to download some of its parts: http://www.microsoft.com/windows/downloads/contents/Updates/W95OS2/default.asp.

Dial-up Networking upgrade. One part of the second service release that is available for download is Dial-up Networking (DUN) 1.2. This new version includes enhancements to Internet connections with updates for the user interface, hands-free automatic dial-up, and DUN server tools that were previously only available with *Microsoft Plus!*.

ActiveMovie. You also might want to snag ActiveMovie while you're at the download site. This video tool for Win95 lets you play a variety of video formats, including QuickTime and MPEG-1.



The Windows 95 Service Releases update your operating system; unfortunately, it's tough to get all of number 2 if you don't already have it.

FAT32. One pretty cool attribute of Win98 that is tough to obtain is FAT32. This new File Allocation Table (FAT) file system stores information more efficiently on a hard drive than the older FAT16 system by using smaller **clusters** (groups of disk sectors treated as one entity by the operating system for storage purposes).

FAT32 uses 4 kilobyte (KB) clusters for drives up to 8 gigabytes (GB) in size. The earlier FAT used a larger cluster, if it even recognized the drive. For example, if the original FAT used 32KB clusters and tried to store a 33KB file chunk, the data would spill over into a second cluster and waste 31KB of space. But FAT32, with its smaller clusters, would store a file in nine clusters, wasting only 3KB of space.

If your hard drive is a parking lot, FAT16 stores data in the form of Winnebagos, taking up extra parking spaces even if they're not needed. FAT32 uses Volkswagen Beetles and uses spaces more efficiently.

Even if you're running Win95 "b," you may not have FAT32 (some OEMs think FAT16 is more universally compatible with older system utilities and programs). Microsoft provides a free tool that tests whether your drive is using FAT32 and tells you how much space you would save if it was. Visit http://www.microsoft.com/windows98/info/fat32.htm and download the 40KB *FAT32 Utility*.

If you're serious about wanting FAT32 without upgrading to Win98, you can check your local used computer stores for a version of Win95 "b" with FAT32. In addition, some OEMs will give you a "b" copy of Win95 with the purchase of a new hard drive or motherboard. Try Seattle Micro (206/441-9111, http://www.seattlemicro.com) or the Computer Clinic (808/487-5267, http://www.compuclinic.com).

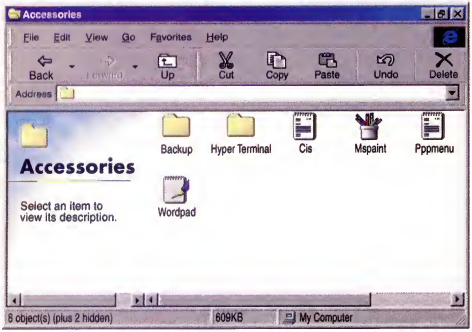
Power Toys. One final download that will push your Win95 capabilities closer to the Win98 range is Microsoft's free Power Toys. Available at http://www.microsoft.com/windows95/info/powertoys.htm, these applets let you get past some Win95 shortcomings. They offer functions including creating shortcuts without "Shortcut To" as part of the name and being able to right-click a folder to view its contents.

A souped up Win95 won't match Win98. Some of these additions are only limited versions of Win98 features. Others, such as DVD-ROM support and a whole slew of diagnostic and performance-enhancing features just aren't available without upgrading. That's the price you pay when you don't pay any price. ■

by Joel Strauch

A Look At Windows 98

If You Know Windows 95 & Web Browsers, You Know This New Interface



When you use Windows 98 for the first time, you'll probably think everything looks pretty much the same as Windows 95. Don't let that fool you. The differences between Windows 95 and Windows 98's graphical user interfaces (GUIs) may not be nearly as dramatic as those between Windows 3.1 and Windows 95, but there are some nice improvements in Windows 98 that will enhance your computing experience. The innovations will make it easier to get on the World Wide Web and navigate the folders and files of your hard drive.

The key to all this is the tight integration between the Web browser and Window 98 (Win98). Microsoft put some key features of *Internet Explorer 4.0* into the operating system itself. If you've rarely used the Web, your Win98 learning curve will be steeper as you learn the browser-like features. For example, you'll be able to bookmark folders and drives, just like you would a favorite Web page for easy repeat visits. The bookmarks will be stored in a FAVORITES folder, which you can access very easily.

Windows 95 (Win95) staples such as Recycle Bin, My Computer, and Windows Explorer are still at work in Win98. The look of applications such as *Microsoft Word* will show little change except for a few minor additions such as the option to view your favorites in the Open dialog box.

This access to favorites is just one of Win98's conveniences. We have a lot more features to explain so you can get more from your computing experience. You'll notice Win98's interface changes most in three places: an open window on your Desktop, such as My Computer; the Start menu; and the Taskbar. For details on Win98's under-the-hood features, see "15 Top New Features In Windows 98" in this issue.

Windows—Web Style. Let's check out the new windows features first. When you double-click the My Computer icon, you will open a window that contains icons for your drives, the Control Panel, Printers, and perhaps other items. But this window looks a bit different than the old Win95 windows. It looks like an Internet browser, complete with an address bar and Forward and Back buttons. Some of the other buttons, such as Copy, Undo, and Delete, appear in this window but not the Internet browser.

The address bar is an easy way to navigate through the maze of your folders and files. If you know the path name of a particular file (such as C:\MYSTUFF\Reports.doc), just type it in the address bar. You'll go straight to that file. Win98 opens the new information in the same window, rather than a second window like Win95 does. That way, you won't have a bunch of windows cluttering up your Desktop.

You may notice that the full name of a folder or directory appears in the address bar before you finish typing it. This is the AutoComplete feature, which works for **Universal Resource Locators** (**URL**s, Web addresses) as well as path names. In fact, you can type in a URL in the window's address bar. When you enter the URL and press the ENTER key Win98 opens your Internet connection and takes you to the Web site. The window will change to Internet Explorer 4.0 (even if you normally use Netscape).

After you open your Internet connection from a window, you can go back to the window by pressing the Back button in the upper-left corner of Internet Explorer. The Forward and Back buttons are great for flipping back and forth among folders and files, just like you would flip among Web pages.

A history list also hides within these two buttons. Let's say you opened the My Computer window and opened a subfolder of your hard drive (usually C:). Now you want to go to My Computer, which is several clicks back. Instead of clicking the Back button two or three times, click the down arrow just to the right of the Back button. It should list C: and My Computer. Click My Computer to display the contents of the My Computer folder in the window. If you want to move back to the subfolder you were viewing a moment ago, click the down arrow to the right of

the Forward button and click the name of the subfolder on the list.

The Forward and Back buttons are definitely time-savers, but there's an even faster way to get to the folders, drives, and Web pages you use most: bookmark them. When you bookmark a folder, drive, or Web page, it's saved in a FAVORITES folder, which you can easily access from a window or Explorer 4.0. To bookmark a particular item, you need to open it. For example, if you want to bookmark a folder called MY STUFF, open that folder in My Computer. You should see the path name of the folder in the address bar. Now, click Favorites in the menu bar and then Add To Favorites. Click OK to save the bookmark in the FAVORITES folder, or click Create In to save the bookmark in a subfolder of the FAVORITES folder. Click the OK button once your choice is made. The MY STUFF folder is now saved in Favorites. Follow the same process to bookmark a Web page you're viewing in Explorer 4.0.

To open a bookmarked item, click Favorites in the Menu bar, then click the name of the item you wish to open. You can open folders from the FAVORITES menu in your Web browser, and you can open Web pages from any window that lists Favorites in the Menu bar.

■ Start Button & Taskbar Speed-ups. The Start button offers another quick way to open a bookmarked item. A Favorites option now appears with the Start button's familiar Documents, Programs, and Settings options. Click Favorites to display your bookmarks to the right of the Start Menu. Highlight the bookmark you want to open and click it.

Win98's Start button has other new and interesting features. For example, the Settings option has two new features: Folder Options and Active Desktop. In Folder Options, you can choose Web Style to make your Desktop act like a Web page. That is, you can open any program on your Desktop by *single-clicking* it rather than double-clicking. Click the Custom option and the Settings buttons to adjust more interface features such as whether folders always open in the same window as we described above. The Active Desktop setting lets you control certain options of your Desktop, such as whether to display the Internet Explorer Channel bar, which contains shortcuts to several sites on the Web.

Of course, you may want to check out sites other than those Microsoft provides shortcuts for in Win98. The Start menu now offers the ability to search the Internet. When you highlight the Find menu, one of the options will be On The Internet. When you click this, Internet Explorer will open to a site on The Microsoft Network where you'll be able to choose from a variety of search engines and conduct a search.

Even after describing all these routes to firing up Internet Explorer in Win98, we haven't covered them all yet. You can customize the Taskbar at the bottom of the screen to get on the Web as well. For example, you can add an address bar and other toolbars to the Taskbar. Here's how:

Right-click an empty spot on the Taskbar. In the pop-up window that appears, click Toolbars. You'll see several choices here. Click Address to give the Taskbar an address bar that works like the ones in a window or in Internet Explorer. If you want to go to a Web page, type the URL in the address bar, and your computer will open your Internet connection and take you to the page. Or, you can open a specific file or folder by typing its path name in the address bar. You won't have the handy Back and Forward buttons at your disposal, however.

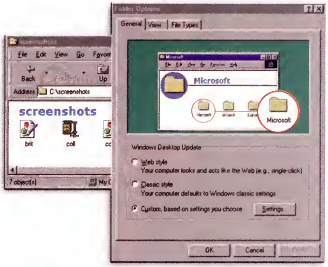
Win98 lets you stick a few other labor-saving tools on the Taskbar, as well. If you choose to add the Desktop toolbar, all the icons that appear on your Desktop will appear in the Taskbar. The Taskbar probably won't have enough room to display them all, so you may have to use the left and right arrows to scroll through the icons.

The Links toolbar contains links to several Web sites that the folks at Microsoft thought might prove handy such as sites providing news, stock quotes, and online yellow pages. There's also the Quick Launch toolbar, which contains icons for Internet Explorer, your Desktop, and the Channels that come with Explorer. Clicking the icon will activate that particular item.

The last option, New Toolbar, lets you place the contents of a folder, or a shortcut to a particular Web site, in the Taskbar. To add a folder to the Taskbar, click New Toolbar, then browse through your folders until you find the desired folder. Highlight it and click the OK button. To create a shortcut to a Web site, type its address in the text field at the top of the New Toolbar dialog box. Make sure you begin with http:// before you enter the rest of the address. To remove a New Toolbar, right-click its title on the Taskbar and choose Close.

It won't take long to learn the new Taskbar options and other new features discussed here. Win98 may not feel too different from Win95 at first, but you'll definitely appreciate the little enhancements that go a long way toward making your computing experience easier. ■

by Michael Sweet



The Start menu's Folder Options dialog box lets you choose just how much of the new Windows 98 interface you want to use.

Little enhancements in Windows 98's interface go a long way toward making your computing experience easier.

Who's Who In Computing

Your Concise Guide To The Biggest Players In Hardware, Software & The Internet

Computers play a part in almost everyone's life today. Anyone who works in a modern office or attends a modern school is probably using one—or fighting against the tide. We work, play, create, destroy, shop, sell, learn, and inform using our PCs. All this from a device few people even dreamed about a mere 30 years ago.

Despite the ubiquity of the PC in our lives, few of us actually think about the role this machine, and the companies behind it, plays in our daily existence. Most of us are happy just knowing enough to get through the day productively, but that's not good enough. Every day more news about PCs and technology come our way via television, print media, and our favorite World Wide Web-based news sources.

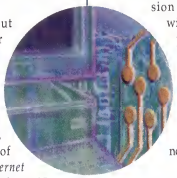
One day it's a story about Compaq Computer's inventory problems, the next an article regarding a little squabble between Microsoft and the U.S. government. It's easy to dismiss all of it as techno-babble, but that's an unwise stance. Like it or not, you are all part of this new Information Age. And at the heart of that age is the PC, the software that runs it, and the Internet that connects it to the rest of the world. Understanding more about the industry behind that PC, its software, and the Internet is not just a good idea, it is essential.

We're not talking about learning which PC to buy or how to better run your word processing program. This is about the industry itself and how different companies directly impact you and your computing. For example, what is the significance of Microsoft bundling its *Internet Explorer* browser with Windows 95 (Win95) and Windows 98 (Win98)? And what is the big deal about Compaq's move to sell computers for less than $1,000?

The following is an explanation of why the actions of these, and other technology-based companies, affect you. We've broken our industry overview into three sections: hardware, software, and the Internet. We then divided each of these sections into three individual companies. Sure, there are more than nine super-influential technology companies out there, but these are our picks. When you finish reading you might not be an industry expert, but you will understand a little more about these major players.

It's The Hardware.

It seems only logical to begin this discussion with the PC. After all, without that machine sitting on your desk—the one you use to run the software that lets you write reports, create spreadsheets, and send E-mail messages through the Internet—personal computing as we know it would not exist.



INTEL CORP.

What: ***Manufacturers processors, the brains behind most PCs.***

Where: ***Santa Clara, Calif.***

Web Address: ***http://www.intel.com***

Why It's Important: A recent figure suggests that about nine of 10 PCs in use are running Intel processors. The company's actions—positive or negative—affect computer makers and users worldwide.

It all started with the release of Intel's 4004 processor in 1971. The company hit the big time, and stayed there, with the release of the 8080 processor in 1974. The chip appeared in the world's first PC, the Altair, and ran at a mere two megahertz (MHz). Next came the 8086 and the 8088. The company created the generation of processors many of today's computer users remember, the 80286, 80386, and the 80486. Finally, Intel released the Pentium, Pentium Pro, and Pentium II (the latest of which runs at speeds up to a staggering 400MHz).

Each generation of Intel's processors is faster and more powerful than the last, relentlessly increasing the level of computing possibilities for common users—and frustrating users who feel the need to be on the constantly evolving edge of technology. Users are not the only frustrated ones. The company's near-stranglehold on the processor market places it in a position of power over even the largest PC manufacturers who must often bend to its will to obtain the chips they need.

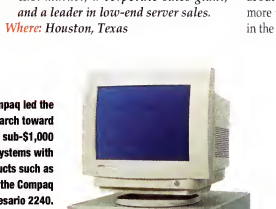
The company's dominance, however, has lessened as rival chip makers (specifically AMD and Cyrix) release comparable chips for lower prices. The rise of the sub-$1,000 PC gave the companies a way into the market, encouraging computer makers to defy Intel and buy from them. According to International Data Corporation (IDC), Intel's share of the CPU market dropped from 93.9% in 1996 to 91.1% in the final quarter of 1997. During that time AMD's market share rose to 4.4% and Cyrix grabbed 2.7%.

Those numbers are not huge, but Intel noticed. The company cut prices on its newer processors and worked to create new lower-priced chips to better compete in the sub-$1,000 computer market. The results of these actions include lower prices on high-end Pentium II-based computers and the release of the new, inexpensive Celeron processor that offers high-end technology in low-priced computers.

While the company endured a somewhat rocky 1997 with income down from the previous year, there is no need to worry about Intel. Its net income for the first quarter of 1998 was still $1.3 billion. Whatever curves consumers and competitors throw at it, there is little chance this powerhouse will lose its position at the top of the PC food chain and for better or worse it will continue to play a dominant role in the industry.

COMPAQ COMPUTER CORP.

***What:* Top-selling retail PC maker in the U.S. market, a corporate sales giant, and a leader in low-end server sales.**
***Where:* Houston, Texas**



Compaq led the march toward quality sub-$1,000 systems with products such as the Compaq Presario 2240.

***Web Address:* http://www.compaq.com**
Why It's Important:* *As the leading maker of PCs for the home and a major corporate seller, Compaq's actions often dictate the direction of the market, as smaller companies move to keep pace. When this company tries something new, or makes a mistake, it can affect the entire computer industry.

In the last year or so Compaq, which carries a dominant 17.1% of the home computer market according to Dataquest, has endured its share of ups and downs. On the upside, it almost single-handedly started the current sub-$1,000 PC craze as the first major computer maker to offer a good, if not fast or powerful, computer in that price range. The move brought more consumers into the PC market and has encouraged others to replace old machines or add a second computer to the home. Despite low prices, Compaq's sub-$1,000 systems offer many of the same features of its high-end machines, a fact that has it winning the dollars of many home users. It is a strategy that should bring customers back when they are ready to buy again.

Also, by looking to chipmakers such as AMD and Cyrix to create the low-cost processors to run those computers, the company lent credibility to the products and struck a blow against Intel's near-monopoly of the processor market. Finally, the company has a little business selling single-processor, PC servers (computers that deliver information to a network) on the side that brought in about $1.1 billion in revenue in 1997. That's more than twice that of its closest competitor in the server market: IBM.

On the downside Compaq has endured some public inventory problems in recent months as it struggles to adapt its distribution and sales structure to match the constantly changing market (with talk of more online sales in the future). Also, rapidly declining PC prices, possibly caused in part by the growth of the sub-$1,000 market, have hurt the company's bottom line. Compaq did not make its way to the top without being particularly good at adapting, however, and while profits might be low for some time, few expect the giant to stay down long.

DELL COMPUTERS

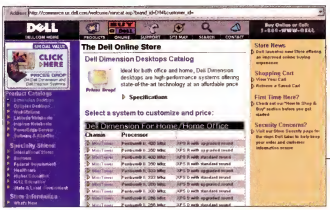
***What:* Currently the second-largest home PC seller and a major force in corporate sales.**
***Where:* Round Rock, Texas**
***Web Address:* http://www.dell.com**
Why It's Important:* *A pioneer in the direct sales market, the company is changing the way the computer industry works and how we buy PCs.

If you're looking for a nearly unblemished success story in the world of computers, look no further than Michael Dell and the "little" company he started in his dormitory room in 1984. Dell is the first company to make it big in the direct sales market (with Gateway close behind). That means customers call in to order a custom-configured machine, which the company builds and ships. Dell also found a way to capitalize on the growing popularity of the World Wide Web; it created

an online purchasing site where the company says it now moves more than $5 million in product each day.

Another key element to Dell's success is its universally hailed customer service and technical support. The company consistently ranks high in consumer polls, and that keeps buyers coming back. The success also has forced other PC makers to take a hard look at their customer service. It's no longer good enough to provide a phone number with a busy signal. People expect some help, and Dell is showing the industry how it's done.

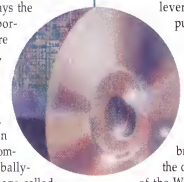
The beauty of Dell's direct-sales strategy, and the reason so many companies—even giants such as Compaq and IBM—are looking to emulate it, is building PCs by the order makes it easier to keep a tighter reign on inventory. That means when hardware prices rise and fall, the company can plan accordingly. How successful is the strategy? The company says it generated revenues of $13.6 billion in the last four quarters.



Dell Computers is a pioneer in the direct sales market; the company is changing the way the computer industry works and how we buy computers.

Making PCs Practical.

The processor and PC are fundamental to computing, but in many ways the software is even more important. After all, whether you're running a Compaq or Dell, chances are you're still using an operating system from Microsoft. In addition to discussing the software giant, we'll also look at Sun Microsystems, a hardware company that created a much-ballyhooed programming language called Java. Finally, there's Oracle, a company whose name many have heard, but whose importance is not understood by the average PC user.



Microsoft Corp.

***What:* The largest software manufacturer in the known universe.**

***Where:* Redmond, Wash.**

***Web Address:* http://www.microsoft.com**

Why It's Important: *Creator of the nearly universal operating systems DOS, Windows 3.x, Windows 95 (Win95), Windows CE (for handheld PCs), Windows NT, Win98, and maker of just about every other type of software—from word processing to home finances to games—you're likely to ever need. Its dominance and business practices have earned it the attention of the Department Of Justice (DOJ).*

Say what you will about Microsoft, the simple truth is most PC users depend on one of its operating systems. Many argue that they would run a comparable alternative if somebody would just make one. Others feel the company's software is the best around. The quarrel many people, and incidentally the U.S. government, have with Microsoft is that the company uses its nearly complete dominance of the operating system market as leverage in other areas of computing.

The current debate concerns the company's practice of including its *Internet Explorer* Web browser software with its Win95 and Win98 operating systems. Microsoft claims the browser is an integral part of the operating system, a reflection of the Web's growing role in person computing. Competitors such as Netscape claim Microsoft uses its operating system to gain a stronghold on the Web that other companies simply cannot challenge. Since it released its first version of Internet Explorer, Microsoft has whittled *Netscape Navigator's* share of the browser market from 85% in 1996 down to about 60% today.

The browser battle is only one of many Microsoft is currently fighting. Companies from many other areas of computing have similar beefs with the company and its practices. Many of those battles will no doubt end up in court, too. In the end, whether the DOJ forces Microsoft to change the way it does business or even if it breaks it up in an AT&T-type deal, Chair Bill Gates and his company will probably remain a dominant force in computing. That is, unless he makes a major misstep or another product comes along to challenge them (Java anyone?). Whether you like the company or not, it's at the forefront of the software development world with the resources and brain power to continue creating the programs PC users need and want.

Sun Microsystems

***What:* Workstation manufacturer and creator of the programming language *Java*, expected by some to have far-reaching effects in the computer industry.**

***Where:* Mountain View, Calif.**

***Web Address:* http://www.sun.com**

Why It's Important: *If Java turns out to be half as important as Sun would lead you to believe, it could seriously challenge Microsoft's role as ruler of the computer universe and may change the way we use PCs.*

You've probably heard your fill about the importance of Java. Aside from some dancing animations on Web sites (called Java Applets), most of us have seen little qualify all of this discussion. In the future, however, it will indeed offer more.

That's because Java lets programmers write programs that run on any platform. (A platform is the combination of hardware and software that make up a PC—such as the Intel/Windows combination common in most PCs.) Today, when programmers sit down to write a program, they must decide for which platform to write it, as each requires its own instructions. Most write for the prevailing Windows/Intel platform. To run the same software on another platform the programmer must port the software to the other platform, an expensive process. Sun designed Java to work on any type of

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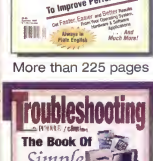

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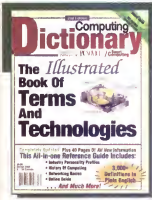

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computer, regardless of its platform, as long as it contains a Java Virtual Machine that can understand Java. That way software that runs on your Compaq will also run on your neighbor's Macintosh.

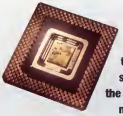
That's only part of Java's appeal. It's also geared toward running on networks and the Internet. After all, what better place to put to work universal programs than on a universal network? If Java fulfills its promise, users may do all their computing with Java programs accessed through the 'Net rather than a hard drive full of bulky software. Sun Microsystems and its CEO Scott McNealy also hope to see Java running in everything from your automobile to computer-like boxes connected to televisions in the future.

The only cloud in Sun's vision is the poor sales performance of the JavaStation, a network computer (NC) the company designed to run Java in a network setting. The company hopes to see NCs replace regular PCs, but the device failed to take off as expected in 1997 with estimated sales of 144,000 instead of the projected 400,000.

Even so, the future looks bright for Java and Sun. Despite the JavaStation letdown the company expects the Java industry to generate about $1 billion in revenues in 1998, and through the next four years it expects the number of Java users to grow from 7 million to 700 million.

Intel's Current Stars

Intel's classic Pentium CPU comes in the square chip package that was the standard for years.



The Pentium processor with MMX capabilities comes in the same package as the classic Pentium, making upgrades easy.

The Pentium Pro has two chips—a microprocessor and an onboard cache. Therefore, it can't be popped into the socket of a previous processor.

Forget upgrading. The Pentium II comes in a whole new package—a cartridge that is inserted into a special slot in a setup similar to an expansion card.

Oracle Corp.

What: ***Self-proclaimed leading supplier of information management programs and the second-largest software maker in the world.***

Where: ***Redwood Shores, Calif.***

Web Address: ***http://www.oracle.com***

Why It's Important: *This company addresses the key commodity of the Information Age with its server and database products that provide the tools companies need to organize and use all that data.*

Oracle is one of those companies you've probably heard of without ever understanding what it does. It offers database and application software, as well as consulting, education, and support services, in more than 140 countries. This is one big company with a large number of products and services. For example, the Applications division offers what it calls client/server modules for more than 35 areas, everything from human resources to sales force automation. The company's *Oracle Database Server* leads the market for Windows NT-based databases, besting even Microsoft.

Oracle is a proponent of what it calls "server-centric" architecture, which its array of software products run upon. Under this setup a large number of NCs, with little power or storage space individually, connect to a powerful server where all the heavy lifting takes place. This strategy opposes Microsoft's stance of putting power on desktop PCs. Because of this Oracle is largely at odds with the software giant (a non-exclusive club).

While much hype heralded the age of the NC, in many ways the early generations of the device failed, due in part to PC makers lowering prices and making the full-fledged alternative to NCs more appealing. Some industry watchers also place a share of the blame at the feet of Oracle's CEO Larry Ellison, who they say might have preached too much, too soon about the future of NCs.

Despite the current sad state of NCs, however, Oracle is standing behind its theory that network computing is the way to go, and the company has the resources to make it happen. Even if NCs do not take off any time soon, the company is still in an excellent position to reap the benefits of a world that is beginning to understand the power of networks, and of the biggest network in the world: the Internet.

The Rise Of The Internet.

Today's PC is a powerful tool. There's a great deal you can accomplish with a super-fast processor, plenty of random-access memory (RAM), a big hard drive, and multimedia tools such as Digital Video Disc (DVD). Despite all that power, there's a simple way to make it better: You can connect to other PCs. It's called networking, and it's the concept behind the best thing to hit computers since the Macintosh: the Internet and the World Wide Web. This great network links people and companies worldwide, letting us exchange information like never before. From gathering research information to reading the daily comics to sending an E-mail to Ma, the Internet changes everything. We selected three companies that represent the dawn of a new type of business that lives and earns in the online world.

America Online

What: ***World's largest online service and Internet gateway.***

Where: **Dulles, Va.**
Web Address: **http://www.aol.com**
Why It's Important: *More than 12 million people use the service to gain access to its specialized content as well as the Internet and Web.*

America Online (AOL) has experienced a roller coaster ride in the last few years. When the company switched to plan of charging a flat monthly amount for unlimited usage in late 1996 the masses signed up with AOL. Their onslaught overwhelmed the online service, producing busy signals and lawsuits. While the company managed to sign up plenty of users, many people felt the damage to AOL's reputation—and that well-known name—might be irreversible.

It looks like those folks might be wrong. AOL worked hard and spent oodles of money to get its service where it needed to be in terms of access. Today, fewer subscribers experience the dreaded busy signal when they try to log into the service. With the service back in shape, some experts are actually starting to sing the company's praises. Better yet, the stock prices are soaring.

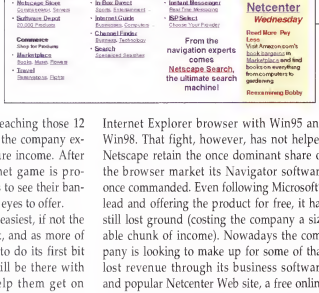
Meanwhile, AOL is figuring out more ways to profit from its huge customer base. Right now a majority of the company's income comes from subscriber fees, but AOL is finding advertisers showing some interest in reaching those 12 million users. That's where the company expects to generate more future income. After all, the name of the Internet game is providing advertisers with eyes to see their banners, and AOL has plenty of eyes to offer.

AOL is probably still the easiest, if not the best, way to get on the 'Net, and as more of mainstream America looks to do its first bit of surfing, the company will be there with those free diskettes to help them get on board. The company's biggest challenge will probably come with the rise of **Web portals**, Web sites that offer many of the features AOL does, such as E-mail, news, and specialized services, for free. Two of the companies gearing up to become major Web portals, and to compete with AOL, are Netscape and Yahoo!.

NETSCAPE COMMUNICATIONS CORP.

What: **Internet pioneer, top browser maker, and one of Microsoft's arch-enemies.**
Where: **Mountain View, Calif.**
Web Address: **http://www.netscape.com**
Why It's Important: *The company still maintains a lead in the browser market, and with more than 21 million visitors hitting its Netcenter each month, it promises to be a major force in the upcoming portal wars.*

One of the first companies to make a living from Internet-related business, Netscape introduced the first mass-market, easy-to-use Web browser. Because of that, the company will always hold a sweet spot in the hearts of early Web visitors. It's also won friends and admirers as a company fighting the good fight in its ongoing battle with Microsoft, which insists on packaging its competing



Netscape's Netcenter World Wide Web site is a free online service designed to help users access Internet resources easily.

Internet Explorer browser with Win95 and Win98. That fight, however, has not helped Netscape retain the once dominant share of the browser market its Navigator software once commanded. Even following Microsoft's lead and offering the product for free, it has still lost ground (costing the company a sizable chunk of income). Nowadays the company is looking to make up for some of that lost revenue through its business software and popular Netcenter Web site, a free online service designed to help users access Internet resources easily.

The company is gearing up to turn its Netcenter into a full-fledged Web portal where visitors will find features comparable to those offered by Yahoo! and other major players. While it has lost a step in the browser battle, the company still owns about 60% of the market.

YAHOO!

What: **A hip and useful directory turned Web portal with more than 32 million visitors a month. .**
Where: **Santa Clara, Calif.**
Web Address: **http://www.yahoo.com**
Why It's Important: *Yahoo! is one of the most successful, profitable, and well-known entities on the Web.*

Web surfers seem to love Yahoo!. Maybe it's because the company was born of such a pure and simple premise: two college friends whose hobby was listing their favorite Web sites. Four years later that hobby is a company with a market value of $5.4 billion. Every day visitors pull down more than 100 million pages from the company's servers. Not bad, for a hobby.

Yahoo! has always stood apart from other Web search services by hiring real people to go out and visit the Web instead of employing computer programs to go out and find Web site information. The Yahoo! folks categorize what they find in a decidedly human fashion. That's a nice touch when you're dealing with the somewhat cold, mechanical feel of the Internet.

Professional Web browsers aren't the only thing that's made Yahoo! the company to beat in the upcoming portal skirmish, either. The company is constantly re-evaluating what it does. It's constantly improving its site content, offering additional services, and making it easier to find what you want (and consequently, hard to leave the site). All that good stuff makes advertisers smile, and that's why the company is profitable. With an eye on what people want, another on what they will want in the future, and a very cool name, Yahoo! promises to be one of the companies directing the computer industry well into the future. ■

by Tom Mainelli

For productivity software, our prices set the curve.

At Wal-Mart, we carry a large selection of productivity software. From automatic virus removal to protection from crashes, come in and choose from a variety of programs that focus on productivity. Becoming more productive with your computer is pretty smart. And with our low prices, getting software at Wal-Mart is pure genius. The Wal-Mart Electronics Department. Let us show you how to achieve savings.

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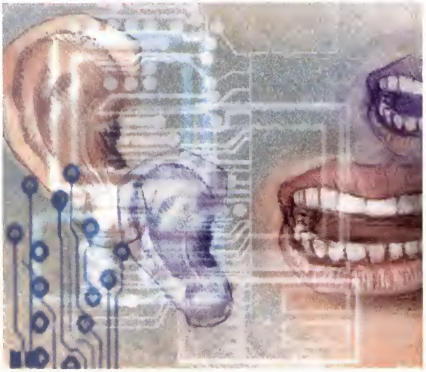
Voice Recognition Advances

Our Speech Recognition Shoot-Out Shows PCs Are Finally Listening

How would you like to be able to input information into your computer by talking instead of typing?

"Star Trek" made us comfortable with the idea, but voice-recognition has proven to be a difficult and elusive challenge to programmers. In 1997, however, Dragon Systems, IBM, and Lernout & Hauspie (L&H) each found ways to let common users input information by speaking to computers. These breakthroughs let spoken words appear on-screen and put PCs at the command of vocal dictations. In 1998, these companies upgraded their products. You will be amazed at their progress.



Note that PC speech recognition has two function classes: dictation and commands. **Command**s control functions: opening, closing, and saving files; editing and formatting text; and printing documents. (See sidebar.) **Dictating** means recording spoken words on your computer screen. This is the application most users want for minimizing typing of letters, reports, and E-mail messages. Software now promises dictation of more than 100 words per minute with 90% to 95% accuracy. *Dragon NaturallySpeaking*, *IBM ViaVoice*, and *L &H Voice Xpress* are major contenders in this category. All three programs have varying command capabilities and let you speak conversationally with only modest differentiation between command and dictation modes.

What's Needed, What's Available. In fantasy films, characters talk freely to computers. By contrast, all current voice products require the user to wear a noise-canceling headset (included with the software). Software "enrollment" training is required to acclimate the system to the user's voice, and more training yields better results. Microphone placement close to the mouth and just to the side is also essential for correct recognition.

The dictation programs also let you add words to a vocabulary list. Starter base vocabularies are 30,000 words each for NaturallySpeaking and Voice Xpress and 22,000 for ViaVoice. Each has the ability to double that from learning. ViaVoice's starter vocabulary can grow to 65,000 words. NaturallySpeaking and Voice Xpress each have a larger backup vocabulary of about 200,000 words. Vocabularies let programs improve

their recognition, provided the user actually trains rather than retypes errors.

All the programs we tested require PCs with Pentium central processing units and sufficient speed, hard-drive space, 16-bit sound card, and a CD-ROM drive for installation; speakers for playback and audio testing; and Windows 95 or NT. We tested on various Pentium systems, mainly a 233 megahertz (MHz) Pentium with MMX.

We tested the most recent versions of each English product: Dragon NaturallySpeaking Deluxe Edition, IBM ViaVoice Gold, L&H's Voice Xpress Plus, and L&H's Kurzweil Voice Commands for *Microsoft Word*. All the companies, however, provide versions for other languages, specialty vertical markets (such as law and medicine), and the Internet.

Discrete vs. Continuous Speech.

Last year was an important one in the evolution of speech recognition software for the masses. Prior to 1997, all speech recognition was based on **discrete speech**. You had to pause after each word: "I... am... now... dictating... this... sentence." Both hardware and software required this. Earlier computers were too slow, and research in speech software was in its infancy. This was acceptable for commands, which are said together as one word: "Open File And Print Page." For dictation, however, discrete speech is too slow. After factoring in errors to be corrected, discrete speech programs approximate the results of a slow typist.

Dragon Systems changed everything with its revolutionary **continuous-speech** product, eliminating the need for those one-second pauses. ViaVoice and Voice Xpress provide the same ability, using context to help discern words. It actually improves recognition enough to let you speak almost naturally with more words at one time.

Some elements *aren't* natural, however. Not only must you speak into a carefully positioned microphone connected to a fast Pentium machine running trained software, but you must observe certain rules. For instance, you dictate not only words but punctuation:

"Dear Bill colon New-Paragraph I got your E-mail period How are you question-mark."

This comes out looking thus:

Dear Bill:
I got your E-mail. How are you?

You get used to dictating that way. All the programs handle punctuation similarly, with few differences. All allow dictating numbers, such as for dates and currency. Of these, L&H Voice Xpress has the most natural and easy means. To have "$12.75" appear, you might say "dollar-sign one two point seven five" or "dollar-sign twelve point seventy-five" with the others, but Voice Xpress lets you say "twelve dollars and seventy-five cents."

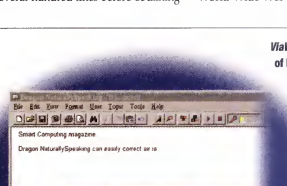
Get Started.

For all the programs, you plug in a noise-canceling headset, install software from a CD-ROM, and set up the microphone and sound card. You then "enroll" to train the system. All these initial steps are crucial, a point each company emphasizes. All three dictation voice products require the user to read several hundred lines before obtaining *any* recognition. This took more than an hour for each, plus more computing time for each system, but just the first time. (*NOTE: Both IBM and Dragon allow for upgrades that use earlier speech-training files, so you don't waste training in earlier versions.*)

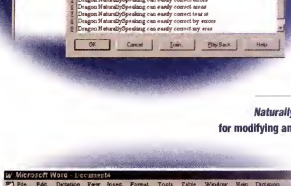
Of the bunch, only IBM ViaVoice first coerced us during setup into obtaining a registration number (available through your choice of modem, fax, toll-free phone call, E-mail, or—*gasp!*—snail mail!).

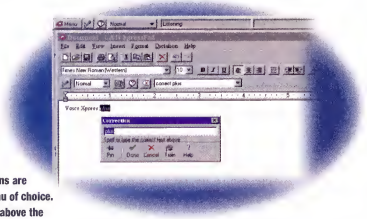
All the programs have modest printed documentation. Of these, the Dragon manual is the best and most complete, while the IBM pamphlet is sketchy because it covers several versions of the product. All have tutorials, World Wide Web sites, and online help. You

***ViaVoice* correction offers a menu of likely choices, but it is limited to one word at a time.**



***NaturallySpeaking*'s correction allows for modifying an entire group of words easily. In this case, we would say "Choose Two" and then "Click OK."**





***Voice Xpress* corrections are by words, with no menu of choice. The floating menu bar above the document allows use in many applications.**

can run tutorials from hard drive (faster) or CD-ROM (saving hard drive space). You also can verbally ask for help with each program, typically commanding "What can I say?"

Look & Feel. NaturallySpeaking, Voice Xpress, and ViaVoice have their own special on-screen speech pads, which look and function like Windows 95's WordPad. In our tests we found these dictation programs function better in their own speech pad than in Word, where they may run slower or have some missing editing or navigation features.

As it comes out of the box, NaturallySpeaking works only in its own speech pad or Word 97. Dragon Systems does two things to extend it, however. First, it includes its discrete-speech *DragonDictate 3.0*, which works in virtually every application. Verbal commands then let you pass control between NaturallySpeaking and DragonDictate. It works, but we weren't crazy about having to go back to discrete speech. Second, Dragon's Web site offers its optional *NaturalText* add-on as a free download for owners of NaturallySpeaking Preferred or Deluxe editions, but not the Personal edition. With NaturalText, we were able to test and extend Dragon's dictation to other applications (various E-mail programs for example) not directly supported by NaturallySpeaking. It initially felt a bit slower and omits a few features found in its speech pad.

Voice Xpress "gets around" by sporting a floating toolbar that works in all environments, not just its special speech pad or Word. It automatically saves whatever it learns, whereas NaturallySpeaking and ViaVoice will prompt you to save speech changes upon closing.

ViaVoice directly supports older Word versions (6 and 7), as well as Word 97 without requiring an add-on. ViaVoice adds menu buttons to your version of Microsoft Word, as will Voice Xpress. ViaVoice, too, works better in its own pad. We were not aware of any means of using ViaVoice outside the speech pad or Word.

Commands. From NaturallySpeaking's speech pad, you can copy text to other applications by commanding "Copy All To Clipboard." Then switch to another window by saying "Switch To Previous Window." Follow with the command "Paste That." We recommend the Natural-Text download so you can dictate text directly in other applications. After just a day we were used to it and found the speed had built up to a high percentage of the speed we found in the NaturallySpeaking speech pad.

Voice Xpress works in any application and has a wealth of commands. This is where this program shows the greatest potential: natural language. Voice Xpress allows variation in language, whereas NaturallySpeaking is more rigid in its formatting commands such as for fonts.

ViaVoice does not implement any such copy-and-paste operation completed by voice and has the fewest options of the three programs.

Voice Xpress had the greatest potential. Its natural language commands are the wave of the future.

Comparing Features. Only Voice Xpress, with its floating toolbar, keeps its processing of text off the page. We found it slower than NaturallySpeaking and ViaVoice, however, which each sport a small, moving box showing the last spoken words. These words, superimposed with the regular text, sometimes change as the software re-interprets what it detects.

Early errors can be egregious. Dictating "Dear Bill" may display as "Deer Bill" or "dare pill". Correction is crucial. All programs were good learners, but there were differences. NaturallySpeaking's moving box actually moves as directed by commands such as "New Paragraph," whereas the box for ViaVoice does not do so immediately. After growing used to NaturallySpeaking's performance, we found it a bit disconcerting to issue this command to ViaVoice and not have the box move to the next paragraph.

Yet, ViaVoice gets some things right that stump NaturallySpeaking, such as "Pennsylvania State University." Both get the words, but ViaVoice gets the full capitalization, while NaturallySpeaking insists on not capitalizing "state," despite training. For NaturallySpeaking to get it right, we have to say "Pennsylvania Cap-State University."

Voice Xpress provided an interesting contrast. We found a small bug in Voice Xpress while editing "state" for capitalization. The cursor was visible at the end of the line, but in fact was treated as still at "state." New dictation or commands broke up the sentence there.

Dictation goofs can be caught with each program's included text-to-speech program. We liked IBM's, which features a funny face that reads back text. It even can be used as a standalone for text not produced with a voice program. Most of the dictation programs, however, fail to read back text properly if there has been manual editing using a keyboard or mouse, another good reason to use voice correction.

NaturallySpeaking provides the best accuracy, speed, correction, and customization (for example, options for one vs. two spaces between sentences). ViaVoice has direct integration with Word, but so does Voice Xpress, which has the strongest and most flexible use of natural commands. All do a fair to good job distinguishing dictation from commands.

The Best Dictator. We preferred NaturallySpeaking over ViaVoice for the former's greater ability to correct, edit, navigate, and control by voice alone. If you make a mistake with ViaVoice, it is necessary to stop dictation in some form, typically by double-clicking the word within the speech pad or clicking the Word menu. This does provide some nice verbal feedback missing from NaturallySpeaking, including hearing our dictation of the word. But this is small consolation when compared with Naturally-Speaking's larger variety of hands-free options. These include saying "Scratch That," "Undo That," "Correct That," "Select That," and others. You also may select or correct particular groups of words anywhere in the document, not just the last thing you said, and not just one word. Voice Xpress allows hands-free correction with "Undo That," but we preferred Naturally-Speaking's correction of groups of words more than Voice Xpress' one-word-at-a-time approach, similar to ViaVoice's.

By voice alone, all three programs let you move the cursor, select any text, and set font attributes such as point-size, bolding, underlining, and italicizing. Voice Xpress does this most flexibly. All occasionally make mistakes by treating commands as dictation, but correction is easiest in NaturallySpeaking.

While ViaVoice lets you stop dictation verbally, we could not start it verbally, although the documentation implied otherwise. NaturallySpeaking provides "Go To Sleep" and "Wake Up." Similarly, Voice Xpress lets you say "Stop Listening" and "Listen To Me." We occasionally elected to use the keyboard or mouse in all programs.

Voice Xpress had the greatest potential. Its natural language commands are the wave of the future. For the moment, however, it is less pleasurable to use than NaturallySpeaking.

Our Recommendation. We have used dictation products for years, so our summary judgment reflects both current versions *and* general familiarity. IBM is a solid company with many licensing deals for ViaVoice, so it will be around. From within Word, it has the fastest start of the products tested. We have used NaturallySpeaking most, but the deluxe edition is much more expensive, so buyers may gravitate toward the personal or preferred edition. Voice Xpress is the newest and most ambitious and has the highest hardware requirements, and we trained it over a shorter period of time. It ran slower than the others, but it is the least expensive of the pack when lining up comparable product versions.

Nevertheless, our conclusion is unequivocal in picking the fabulous NaturallySpeaking over ViaVoice. Were there no NaturallySpeaking, ViaVoice with its good learning would be considered the leading product. Advantages IBM had in previous versions have eroded. ViaVoice always allowed multiple users on a single computer, whereas NaturallySpeaking previously did not. This has been rectified in some editions of NaturallySpeaking, and it is also in Voice Xpress Plus.

The wild card in our analysis is the recent introduction of L&H Voice Xpress/Voice Xpress Plus with its natural language. However, its correction and performance still left us wanting something more like NaturallySpeaking's.

Voice-recognition is among the best and most exciting reasons to buy a new Pentium-based computer. Pick a system, study its operation, and keep training. It may not be Star Trek, but the results you get in accuracy, speed, and control will reward your effort. ■

by Michael W. Ecker, Ph.D.

For More Information:

NaturallySpeaking Deluxe 2.02
$695
NaturallySpeaking Preferred Edition
$159
Dragon Systems
(800) 437-8466, (617) 965-5200
http://www.naturalspeech.com

ViaVoice Gold
IBM Corp.
$149
(800) 825-5263, (972) 613-3589
http://www.ibm.com/viavoice

L&H Voice Xpress Plus 1.0
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Lernout & Hauspie
(800) 380-1234, (781) 238-0960
http://www.lhs.com

Commands Only?

Lernout & Hauspie's *Kurzweil Voice Commands* is unique among the products we reviewed in being solely for issuing verbal commands, not for dictation. Moreover, it is limited to *Microsoft Word*. That is not a severe limitation, however, given the popularity of Word.

Voice Commands gets you started rapidly. We were issuing commands within Microsoft Word for Windows 95 in minutes. We were opening, closing, and saving files; creating tables and formatting text; and printing documents or selected portions.

The beauty of Voice Commands lies not only in its recognition of commands spoken continuously, but also almost naturally. It understands a large variety of expressions. You can say "Make that Times Roman in 12-point size," or "Change last paragraph to 12-point Times Roman," or other almost unlimited variations.

To see the power of the commands, contrast the difference between the usual approach to table creation. Rather than go to the Word menu to create a five-cell by five-cell table, specifying rows and columns, we simply commanded: "Make a five-by-five table." If we wanted to center the table, we could just follow up with "Center that!"

Although we did not see any indication of Voice Commands allowing added vocabulary or new commands, we found it so flexible and it covered so many features of Microsoft Word that we never felt we missed anything. Those interested solely in commands will want to grab a copy of Voice Commands. □

For More Information:

Kurzweil Voice Commands for Microsoft Word
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http://www.lhs.com

A Formula For Formulas

Demystifying The Way Spreadsheets Do Math

Once you learn to use one pocket calculator, you can use them all. It may take a little time to find some of the keys, decipher their markings, or even find the power button, but the functions, abilities, and results are essentially the same from one calculator to the next.

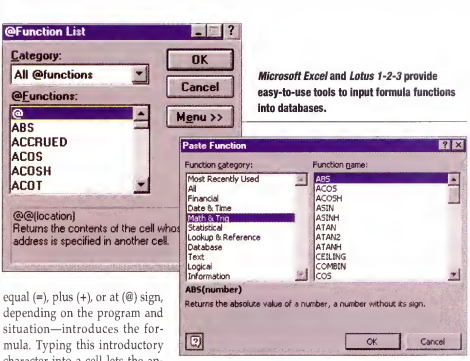
Using spreadsheet programs on that fancy calculator called a personal computer is much the same. Whether you are running *Lotus 1-2-3*, *Microsoft Excel*, or a less common spreadsheet application, the basic tools and principles carry throughout as surely as the plus, minus, multiplication, and division signs on your calculator. With a little background knowledge of how spreadsheets work, you can easily decode the math on any spreadsheet—and begin to harness the power of your PC beyond a pocket calculator's wildest dreams.

What's more, when you have a firm grasp on formulas in spreadsheets, the kinds of formulas you encounter in other kinds of programs, such as tables in word processing documents, are intuitive, since they are often just pared-down versions of the formulas in spreadsheets.

Spreadsheets show information in rows and columns, with the **cell**, the rectangular space where a row and column meet, holding the basic unit of information. Each cell has a **reference**, based on its location: the column letter and the row number. The first step to being comfortable with spreadsheets is getting used to dealing in A12s, H43s, and M5s. Some applications refer first to the worksheet letter (with each document capable of supporting multiple worksheets), then to the cell location, with a result such as A:M5, which refers to row 5 of column M of worksheet A. It may seem a little intimidating at first, but it soon comes naturally.

The primarily text-based **labels** on a spreadsheet identify the data of a given area. Most of this data is just what it appears to be, whether it is made up of numbers, letters, or other characters, and whether the document is printed or on-screen. Some of the information shown in a spreadsheet, however, is not exactly the data that the user entered. Instead, it is the result of a **formula** that performs any number of mathematical functions. The *result* of the formula appears in the spreadsheet; the formula *itself* can be viewed while the cell is selected, in the **formula bar** toward the top of the application window.

Bits & Pieces. Each formula follows a certain set of rules, no matter the application. First, one symbol—probably either an



equal (=), plus (+), or at (@) sign, depending on the program and situation—introduces the formula. Typing this introductory character into a cell lets the application know that the following information will not be ordinary data; it will be a formula. If the user wants to enter text as part of the formula, it must be in quotation marks. (Alternately, to enter text that begins with the same character as introduces a formula, users type a single quotation mark or apostrophe.)

Formulas themselves consist of three basic parts: operands, operators, and separators. With an understanding of these parts, almost any formula can be decoded.

1. **Operand** is a fancy word for the actual value involved, either as cell references, numbers, text, or some combination thereof. Examples include what are known as **numeric constants**, numbers such as 560, –3, $1.32, or even 10/10/73; a representative value such as B1 or B2; and any text enclosed in double-quotes, such as "Total."
2. **Operators**, on the other hand, do the actual work of a formula, using the operands as data. Each program may explain operators a little differently, but there are essentially four kinds: text, arithmetic, comparison, and reference.

   The lone **text operator**, the ampersand (&), strings together text without inserting any extra spaces, a trick called **concatenation**. For instance, suppose a spreadsheet contains directional information: north or south in cell B1, and east or west in B2. To combine those values into another cell, the user types **B1&B2**, perhaps for a result of **southwest**. (Theoretically you should be able to place a number in quotes and have it read as text. If it is placed in a spot where a number ought to be, however, the spreadsheet may read it as a number anyway.)

   Arithmetic operators are the ones taught in elementary school math, though sometimes with different faces. The plus sign (+) stands for addition; the minus sign (-) is for subtraction or a negative number. The asterisk (*) replaces the "x" traditionally used for multiplication, and the forward slash (/) sits in for the division sign. The caret sign (^) represents exponentiation (3^2 is represented as 3^2). Arithmetic operators are the simplest and most common type of operator, and they can be used with numeric constants and cell references. For instance, if the user wants to add the number 5 to the value in cell B1, she enters **5+B1**. To multiply cell B1 by B2, she types **B1*B2**. Also, even dates can be added and subtracted with arithmetic operators.

   Comparison operators (sometimes called logical operators) also have familiar faces. The equals (=) sign, less than (<) sign, and greater than (>) sign do just what they imply, and others are only slightly different from grammar-school math: <= stands for less than or equal to; >= means greater than or equal to; and <> means not equal to. (Just try to find ≠ on your keyboard.) If logical operators such as And, Or, and Not are used, they may be entered between pound signs, (for example, #AND#). Although the use of comparison or logical operators is more advanced than arithmetic ones, this is the area where spreadsheets can really blow away a basic calculator. We will give examples later when we talk about functions, and in the sample spreadsheet graphic with pullout formulas.

   Other types of punctuation also come into play, including **reference operators**. Commas (or sometimes semicolons) can be used to list multiple cells. For example, if a user wants to represent a column of cells including B52, B53, B54, B55, and B56, he types them as **B52,B53,B54,B55,B56**, with no spaces in between.

   But then, there are quicker ways of doing things. Users can give a **range reference**, rather than individual cell references. Again, depending on the spreadsheet, **B52–B56**, or **B52:B56**, or **B52..B56** could represent that same column of cells. Likewise, **B52–F52** or **B52..F52** could represent the 52nd column in rows B, C, and D. In fact, the use of colons, dashes, and semicolons, as we have already discussed, is sometimes considered the next and final element of a formula, the separator.
3. Fortunately, **separators** are more straightforward than operators, and they bring organization to the formula. Anyone who's worked with spreadsheets knows that parentheses are ubiquitous. They help the spreadsheet sort information; any operation within parentheses is dealt with on its own, first. If the formula reads (2+3)*4, the (2+3) is added first; (5)*4 results in 20. The formula 2+(3*4) yields a different answer, however, because 2+(12) equals 14.

Even if longer formulas are used, with multiple cell references, the principle is the same. The application starts with the innermost set of parentheses and works its way out and to the right. The inner values are referred to as **nested**, and the formulas can get pretty detailed. Suppose a spreadsheet includes the formula (B3*((B1*5)+(B2*4)))/4. The spreadsheet first performs the calculations of (B1*5) and then (B2*4), then adds the results together. Only then will it multiply the whole result by B3 and then divide it by 4. In fact, if a user ever gets stuck on a formula that's not working, the first thing to do is make sure every left parenthesis has a right one down the road.

Enclosing a calculation in parentheses overrides the natural ordering process the spreadsheet uses and forces the spreadsheet to perform the calculation within parentheses first. Beyond that, how the spreadsheet does calculations varies slightly depending on the application. (See table for details.)

Note, too, that parentheses displayed on the spreadsheet itself—rather than in its formula—denote negative numbers. After all, not everyone has a colored printer, or even monitor, to mark red numbers.

One other important aspect of spreadsheets in general is the difference between absolute and relative cell references. A **relative** cell reference is based on the formula's location; for the most part spreadsheets use relative cell references by default when a user copies a formula. For instance, if a formula that adds a column of numbers is copied to another column, the spreadsheet assumes it should add the new column, rather than repeat the old calculation cell for cell. An **absolute** reference, on the other hand, refers to a specific cell. If the formula is copied, the formula still refers to the same cell. The value B1 creates an absolute reference to the cell B1.

Putting It All Together. Once you understand cell and range references and the pieces of a formula, the built-in formulas of any spreadsheet application, called **functions**, make sense. These functions—or @functions, as Lotus 1-2-3 calls them—vary quite a bit from program to program, but they all follow the same structure. After typing an @ sign with Lotus 1-2-3, the user types the function name, then within parentheses enters the cell references or other values for the equation.

For instance, many applications offer a SUM function for performing addition. Entering **SUM(B1,B2)** serves the same purpose as **B1+B2**. This doesn't seem like much of a time saver until you start using range references—**SUM(B1–F1,B2–F2)** or **@SUM(B1..F1,B2..F2)**—rather than typing each cell reference with a plus sign in between. Other basic functions are COUNT or @COUNT for counting the number of items, AVERAGE or @AVG for averages, and MAX (@MAX) and MIN (@MIN) for using the maximum or minimum value in a set of cells.

These formulas can be more complex, as well. For instance, the IF function gives a result based on whether a value meets a certain criteria. It follows the formula IF(logical test, true value, false value), but without blank spaces. Suppose a manager wants to give bonuses based on whether a salesperson met quota. If the total sales are entered in cell B1 and must be at least $1,000 for a 5% bonus, the formula reads **IF(B1>=1000,(B1*.05),"no bonus")**. Both a true value and a false value must be entered; if the user wants a false result to leave the cell blank, she enters the false value as an empty quotation, **""**.

The same logic follows with other functions. For example, with AND, the value in question must meet more than one criteria to be true. The formula is **AND(logical test 1, logical test 2), true value, false value**. Perhaps the manager decides to give bonuses only to employees who met quota *and* had fewer than three absences, with a formula something like this: **AND(B1>=1000,B2<3),(B1*.05),"no bonus"**.

Once these basics of formulas are mastered, working with data efficiently becomes easier and easier. The help menu of the spreadsheet program gives the formula for each function, and its pieces easily can be broken down into something understandable. The user need only apply what he already knows about the way spreadsheets do math to make the function work. Furthermore, because formulas are the powerhouse of spreadsheets, the formulas encountered in other programs will be no-brainers.

With a little practice, anyone can break apart any function into understandable chunks—and begin to build something even bigger. ■

by Sarah D. Scalet

Order Of Operations

In a formula, calculations within parentheses receive priority. After that, the order may vary slightly from program to program. Here are highlights of order hierarchy, as explained by two popular applications. When a formula has more than one operation with the same preference, the application works left to right.

Lotus 1-2-3

Precedence	Operation	Operator
1	Exponentiation	^
2	Identification of value as negative	–
3	Multiplication, division	*, /
4	Addition, subtraction	+, –
5	Equal-to, not-equal-to	=, <>
	Less-than, greater-than	<, >
	Less-than-or-equal-to, greater-than-or-equal-to	<=, >=
6	Text string concatenation	&

Microsoft Excel

Precedence	Operation	Operator
1	Identification of value as negative	–
2	Percentage	%
3	Exponentiation	^
4	Multiplication, division	*, /
5	Addition, subtraction	+, –
6	Text string concatenation	&
7	Equal-to, not-equal-to	=, <>
	Less-than, greater-than	<, >
	Less-than-or-equal-to, greater-than-or-equal-to	<=, >=

Inside Spreadsheet Formulas

This is your chance to get the inside scoop on the formulas in a *Microsoft Excel* spreadsheet. The punctuation marks vary from application to application, but the same principles apply in formulas in all kinds of programs.

=G4-G3
Like any number, dates can be subtracted by using the minus sign. The way numbers are displayed—including whether they are displayed as dates—is controlled through formatting, rather than formulas.

=IF(B11<=75,B11,75)
This company limits the cost per night of hotel rooms. If the room costs less than or equal to $75, the spreadsheet uses the data in row 11. If not, as in this case, it enters the number 75. The rest of the columns meet the requirement, so the actual price is reused.

=B5*(B8+C8+D8+E8+F8)
Because the cell references for the mileage data are in parentheses, those values are added first, and then the total is multiplied by the cost per mile in cell B5. The dollar signs create an absolute reference to B5, so even if the formula is moved or copied, it refers back to the same cell.

=SUM(B16:F16)/2
Because the company only pays for half of entertainment costs, the sum of the cells is divided by 2, using the forward slash (/).

G21 = =SUM(G19,G12,G8)

	A	B	C	D	E	F	G
3	**Employee name**	K. Gieler				**Date left**	6/22/98
4	**Description**	Trip to conference in Boston				**Date returned**	6/26/98
5	**Mileage**	$ 0.35				**Days gone**	4
7	**Transportation**	**Mon**	**Tue**	**Wed**	**Thur**	**Fri**	
8	Miles driven	97		16	4	97	$ 74.90
10	**Lodging**	**Mon**	**Tue**	**Wed**	**Thur**	**Fri**	
11	Hotel	$ 89.51	$ 69.51	$ 69.51	$ 69.51		
12	Up to $75/night	$ 75.00	$ 69.51	$ 69.51	$ 69.51		$ 283.53
14	**Other**	**Mon**	**Tue**	**Wed**	**Thur**	**Fri**	
15	Meals	$ 35.00	$ 40.00	$ 20.00	$ 35.00	$ 15.00	$ 145.00
16	Entertainment	$ 98.00					$ 49.00
17	Supplies						$ -
18	Phone/fax						
19	Total						$ 194.00
21	**Total Expenses**						$ 552.43
23	**Expense Review for K. Gieler's Trip to conference in Boston**						
24	Average hotel	$ 74.51		**Approved on**	7/1/98		
25	Highest meal day	$ 40.00		**Bonus?**	yes		$ 30.00
26				**Initials**	sds		Issue check for $582.43

=SUM(B12,C12, D12,E12,F12)
Rather than adding the cells with plus signs, the user entered the SUM function, a built-in formula that adds the cell references in parentheses. *Lotus 1-2-3* uses the at (@) sign before each function, rather than an equals (=) sign, so the formula would say @SUM rather than =SUM.

=AVERAGE(B11:F11)
The AVERAGE function works the same as the SUM one, with the cell references in parentheses.

=IF(SUM(B18:F18), SUM(B18:F18), "")
Above, in cell G17, a blank value appears, because the spreadsheet totaled nonexistent values. The IF function helps users avoid this. If there is a value to add together in the cells, it is displayed in the spreadsheet. If not, nothing is displayed, since there is nothing between the two quotation marks.

=MAX(B15:F15)
The MAX function, which shows the maximum value of a range of cells, also works the same as the SUM function.

=IF(AND(E25= "yes",G5>2),(G5-2)*15,"")
An AND function can be listed within an IF function. In this case, if the authorizing party enters "yes" to approve a bonus, and if the person filing the expense report was gone for more than two nights, the traveler gets a $15 bonus for each additional night on the road, which is calculated by the (G25-2)*15 portion of the equation.

="Expense Review for "&B3&"'s"&B4
The ampersand (&) key strings together text, which must be enclosed in quotation marks to be included in a formula. Because the "&" doesn't add any blank spaces, users must enter their own.

=IF(E24,"Issue check for $"&(G21+G25),"Payment pending")
Here, a text string is used within an IF function. If a number is entered in cell E24, the true value appears; if no number is entered, "payment pending" appears. Any other answer will flag the area as an error.

Spreadsheet vs. Database

Which One Offers The Best View Of Your Data?

You probably understand how to use most of *Microsoft Office's* parts, but what about the *Access* application? You know it's a database for keeping information, but the details of using such a tool aren't so clear. Besides, you keep your data in a spreadsheet, and it works just fine.

Meanwhile, the number of spreadsheets you work with is increasing and you're doing lots of tweaking to get them to pass data back and forth. There must be an easier way than scrolling through rows of data to find answers. Maybe it's time to revisit that database thing. Understanding when to use either a spreadsheet or database for your records can mean the difference between facing a bunch of overwhelming numbers and operating a business intelligently.

A **database** is simply an organized collection of information. Users record many types of information in databases such as inventories, projects, addresses, customers, and invoices. Recording lists of information in a database makes it easier to organize and retrieve it later. Before computers, users kept databases in file cabinets, in card files, and on graphed paper, even though they weren't always called databases. The key difference between these storehouses and database applications is the **relational** nature of the digitized databases.

Let's say you kept a list of contacts in a card file, with each card listing the contact's name, business, and address. If you made several contacts at the same business, you would end up rewriting the same address on each card. With a relational database you enter the address once for that business, and then each contact can be linked to that business and address. Through this behind-the-scenes linking, every time you pull up a contact, all relevant information appears as if it were stored in the same record. Relational databases keep the file size smaller, make data access faster, and reduce the chance of incorrect information by recording everything only once.

Spreadsheets tend to stand in for databases because spreadsheets are easy to use and familiar to many users. Just create some categories in the columns, enter some data, and you're done. Many users also get intimidated by the less-than-intuitive format of a database application. Despite their familiarity, however, spreadsheets are a poor choice for data management. Their strength is in crunching numbers, not organizing records.

The Spreadsheet Solution.

Spreadsheet applications such as *Microsoft Excel* and *Lotus 1-2-3* exist largely to process numbers for budgets, forecasting, and other mathematical calculations. The spreadsheet's format of columns and rows, like that of a multiplication table or ledger book, is familiar to most users. Other features such as the ability to create complex formulas and automate computations make a spreadsheet preferable over manipulating figures on paper.

The types of data best suited to a spreadsheet include "what-if" scenarios such as budgets, involved computations such as taxes, or financial models such as product and sales analyses. Inventory ordering and other rote calculations that can be automated work well in a spreadsheet. These applications are also strong in graphing and charting data that helps interpret numbers. If much of the data you work with is numerical and requires computations or graphing, open a spreadsheet. Do not even try detailed financial analysis with a database. If needed, however, you always can store raw numbers in a database and export relevant records to a spreadsheet when you need serious number crunching.

This workhorse nature of spreadsheets makes them a common choice for storing lists. Microsoft estimates that more than 70% of Excel users use it as a database. While some popular spreadsheets include a few database

functions such as data entry forms and some data controls, these functions are less comprehensive than those in a database. For example, let's say you want a list of all students in a class with a B average or higher. If you kept these records in a spreadsheet you would perform a sort; in a database you would run a **query**, or search. A sort would list all the students from the ones with the highest grades to the lowest. A query would produce a table of only those students with the desired grade. Furthermore, a query can provide much more detailed responses such as a list of just seniors with at least a B average who have taken calculus. You can't do this by sorting.

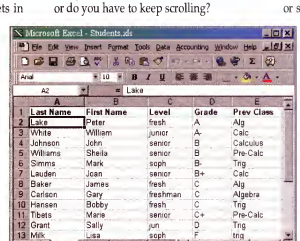
Databases also outperform spreadsheets in the area of data integrity. A database can place better controls that restrict data to specific ranges and default values ensuring consistent and correct data. If you keep an inventory, you might want to make sure item types are restricted to things such as "disposable" or "equipment" and a receipt is filed for "equipment" items more than $100. A database can restrict particular data to a list of acceptable values, in this case "equipment" or "disposable," and refuse incorrect data with a detailed error message. Either a database or spreadsheet could have a receipt reminder pop up each time an item more than $100 is entered. Only the database, however, can cross-reference the data to make sure the item is an "equipment" item as well as more than $100 before accepting the entry.

You can consider sticking with your spreadsheet-as-a-database approach if you work with a small number of records; 2,000 or less is a very manageable number. If you regularly create new spreadsheets to keep your information organized, you should probably move to a database application.

You also can consider using a spreadsheet as a database if the relationships between the data are simple. A simple list of customer orders could be organized easily in a spreadsheet. However, if you need to link employee data to customer orders and to payroll (say your salespeople earn a commission based on the size of their orders), the relationships become more complex and better suited to a database application.

The problems start when the spreadsheet can't keep up with your data needs. Spreadsheet applications don't provide the depth of functions that ensure good data such as restricting data to specific ranges or formats and maintaining links among related data. Databases are better at providing data access by supporting complex searches, intensive data entry, and multiple user access. If you currently use a spreadsheet to store data, ask yourself the following questions:

- Do changes made in one spreadsheet force you to make changes in another?
- Do you have several spreadsheets containing similar information (such as separate sheets with inventory for Dallas, D.C., and Detroit)?
- Do you want some data to be hidden from some users?
- Can you see all pertinent data on one screen or do you have to keep scrolling?



This spreadsheet is a limited tool for managing information. Problems visible here are inconsistent entries in categories such as Level and lack of space for notes. This will make managing the information difficult later.

- Are several people accessing the data at the same time?
- Do you have a hard time viewing specific sets of data you want?

If you answer yes to at least two of these questions, you should think about moving data to a database application.

The Next Step. Detroit's Fresh Rolls bakery is a good example of a small business that outgrew the spreadsheet approach. When Fresh Rolls had only two employees and offered a few baked goods Owner Harold Cephus tracked products sold, supplies purchased, and goods ordered on Excel spreadsheets. He printed monthly spreadsheets to check his progress and see where he could make changes. Through the years Fresh Rolls grew to a 10-person operation, offering specialized wedding cakes and a sit-down café. Cephus says keeping track of inventory with monthly spreadsheets became difficult. It took a long time to sort through the order spreadsheets to find the status of specific orders. The spreadsheets grew too numerous to manage. His assistant couldn't understand the system of spreadsheets and would avoid using them. By the time Cephus was ready to open a second shop, he was looking for a better way to track his business information.

Cephus' choice, like yours, deals with two types of databases: standalone and server-based. **Standalone** databases (Microsoft Access, *Lotus Approach*, *Corel Paradox*) can run on a single PC or share data among several users. Many standalone databases are simple enough for a novice to start building immediately and rugged enough to build multiple-user enterprise applications.

Server-based database applications (Oracle products, *Microsoft SQL Server*, *IBM dBase*) store all data on a **server** (a computer that makes data available to a network), while the applications that access the data reside on the workstations. They can handle massive amounts of data and include features that make constant multiple-user access fast and reliable. You'll need professionals to help you set up these heavy-duty applications.

Standalone Databases.

Most standalone databases consist of several parts—tables, queries, forms, and reports—that work together to organize and present data. The foundation of the database is the **table**, which holds the actual data, defines the data categories (or **fields**), and links related data. You use queries to find and retrieve specific records. Forms are templates you can create to easily view, enter, and change data in the tables. **Reports** are templates for the printed output.

These parts work together when the user opens the database application. Users see a form where they enter data, which is stored in tables. Users may enter criteria in a form to search for data, and the form runs a query. The information returns in a form on-screen or printed in a report if the data must be on paper.

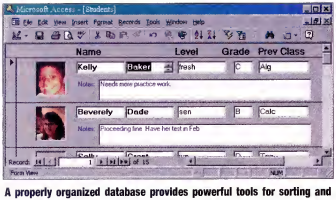
Several popular standalone databases make it easy to get started. Tutorials and **wizards** (pop-up screens that guide a user through performing specific tasks) appear and help novices become productive immediately. If your database requirements become more

complex, you'll have to spend time learning the application's tools through a manual or class or hire a professional developer.

You usually can move existing data from another source into a database fairly smoothly. The process is sometimes as simple as choosing a menu item to import data. Most standalone databases can import data from text files, spreadsheet files, and other databases.

Server-Based Databases. There may come a point with an expanding business when a standalone database is insufficient to hold the records.

Brigadoon.com, a small Internet service provider, found this out. Brigadoon.com grew in 2 1/2 years to almost 20,000 users. Each user account included billing information, Internet usage records, and a history of technical support. Brigadoon.com kept this data in an Access database designed by the information systems (IS) staff. The database was quickly growing and with eight users constantly accessing it, it was quickly growing sluggish. By the time Brigadoon.com reached 30,000 users, the accounts staff members could take 20-minute coffee while they waited for the shared database to load on their workstations.



A properly organized database provides powerful tools for sorting and displaying information in relevant ways.

Brigadoon.com's experience demonstrates the limits on using standalone databases. As more users need to access data or data needs to be available constantly, standalone database performance suffers. When this happens it's time to consider a server-based database.

These setups generally consist of three parts: the **database management system** (**DBMS**), the user application, and queries. The DBMS resides on the server and does the work of storing and managing the data including allowing access, processing queries, and running utilities. The **application** is the front end that users see when adding information or entering criteria for queries. The application usually resides on workstations and may be included with the DBMS package, be custom-written by a programmer, or even be a standalone database such as Access. Queries are written in a special programming language that runs between the application and the DBMS. **Structured Query Language** (**SQL**) is one of the most popular query languages used to request information from a database.

Which To Use? The difference between standalone databases and server-based databases is the latter requires a server. This may be simple, but the server-based solution provides a few advantages over standalone.

The most significant is that many users can access, add, and change data concurrently. While multiple users can share standalone databases on a server to view data, only one user at a time can add or edit records. In addition the performance of a shared standalone database typically slows down with each user added. A server-based database separates the data storage and application functions across more than one machine, easing the load on both and improving performance.

Both a DBMS and a standalone database can hold massive amount of records. A DBMS has an advantage of residing on a server (and on presumably server-capacity hardware) and not having to share disk space with the application stored on workstations.

With tasks such as automatically compressing data, coordinating backups, tracking usage statistics, and recovering data in the event of a power failure, utilities included with a large database engine provide even more efficiency and safety than a standalone.

Lastly, with a server-based database all data is stored in one place for a single point of administration. Users can centralize management decisions on issues such as hardware upgrades and personnel support. This provides a single point of failure, but this risk can be minimized with tools such as tape backup and disk **mirroring**, replicating a hard drive's contents on another drive.

Consider moving to a server-based database if the following apply:

- Many processes must run in parallel like backups while the database is open.
- Users must access the data at any time.
- Several users need to add or edit data during the same hours.
- Your current database takes a long time to open or to run queries.

A server-based platform involves an investment. Besides sturdy server hardware, you will need to hire a programmer to develop the front-end application and queries. You'll also need a database administrator (DBA) to build and manage the DBMS structure.

Migrating data from other applications to a server-based database is more involved and may be part of the professional developer's service. Many DBMS applications provide utilities for importing data from other sources.

Find A Program. Once you have an idea of which platform would best manage your data, list your data needs before buying a program by answering these questions:

- What data are you working with (numbers, text, graphics) and what must happen with it (reports, searches, data storage)?
- What type of information or analysis are you looking to get from your data?
- Will you import or export much data?
- How do you want users to access data?
- How does data flow in your current process?

After you complete this list, visit a software store or browse the Internet (Yahoo!'s Computers, Software section lists many software packages) for information on specific applications. Start by investigating applications you already have in a software suite. There are also quite a few applications written specifically for various businesses from art stores to toy manufacturers. Programmers often write these programs on top of an existing database application, so understanding how databases work is still helpful. These programs are sold commercially or as **shareware** or **freeware** (low-cost and free software) for the finding (http://www.download.com is one good site for shareware). If you're looking for a professional developer, try listings on the Web or the yellow pages under Computer Consultants.

Well-organized data is crucial to running informed businesses. With good data management, business data becomes business intelligence for sound decision making. ■

by Tracey Dishman

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Name_____ Age_____

Street_____ Apt. #_____

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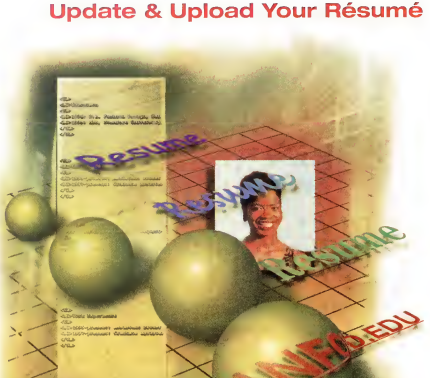
Build A Web Site, Part 2

Update & Upload Your Résumé



Welcome back to our three-part series on building your first World Wide Web site. In this second installment you will add finishing touches to the résumé Web page you started in the first installment. You will throw in special features such as stylized text, graphics, and hyperlinks. Then you will see what it takes to upload your résumé to the Web.

To complete the project, you will again be using the *Netscape Composer* Web authoring tool that is part of the *Netscape Communicator* browser suite and a simple text editor such as WordPad, the word processor built in to Windows 95. Other Web authoring tools work similarly to Composer, and Windows 3.1's Notepad accessory also works as a text editor. The authoring tool allows you to adjust the look of pages in a graphical environment where you immediately see your changes. The text editor lets you manipulate the codes of the **Hypertext Markup Language** (**HTML**) that make up the Web page.

To practice uploading files to the Web, you'll need an Internet connection and hard drive space on your Internet service provider's (ISP's) Web server, a computer that makes information available to a network. Most basic Internet access accounts include some server space at no extra charge; contact your ISP for details.

A Way With Words. Let's start by adding life to the words in our professional biography. Open Netscape Communicator, go to the Communicator menu, and select Page Composer. Next, open the résumé Web page you created with last month's instructions. (Use the File menu's Open Page [File, Open Page] command to find it.)

The Format menu provides many different ways to add stylized text. For example, here's how to add color to your words.

1. Highlight a word or phrase in the résumé, then go to the Format menu and select Color.
2. Move your cursor over any color in the palette. When the color's square is initially highlighted, you'll see its numeric values (sometimes called **RGB** or **red-green-blue values**) and the corresponding HTML color codes.
3. Click a colored square, and Composer automatically inserts these HTML codes into the document to effect a change in the text. This process demonstrates how a graphical authoring tool handles much of the nitty gritty of HTML coding. If you were writing all the HTML coding yourself, you'd have to type in the color codes and other information. Still, it's smart to educate yourself about the codes working behind the scenes. Click Preview, then choose View, Source to see the codes that create what you see onscreen. This is a great way to gradually learn HTML coding.

It may be a little too easy to format text in Composer. Be ultra-aware of your audience. Like it or not, flashy colors and blinking text are marks of an amateur Web page designer.

To remove formatting, highlight the formatted text and uncheck the style under the Format menu. Or you can remove all formatting by selecting Remove All Styles.

Resizing text. Here's a trick with type. Capitalize your name at the top of the résumé and use large initial caps to create an understated, printed look. Here's how:

1. Highlight your name at the top of the page, then retype it in all caps.
2. Select the first letter of each word, then go to Format, Size and select the 24-point type style for a sharp look. Save your work.

Add Hyperlinks. If you have impressive credentials on your résumé, give readers a chance to examine them more carefully with a

hyperlink. This clickable text sends viewers to another page on your Web site, or any other page on the Web. The college you attended may have an impressive Web site, for instance. Here's how to add a link.

1. Highlight the text you'd like to make a hyperlink. Then select Insert, Link.
2. In the Character Properties dialog box, type in the full **Universal Resource Locator** (**URL**, or Web page address) for the Web site you want to link to. For example: http://www.stanford.edu.
3. Click Apply, then Close.

Now when you place your cursor over the link, you'll see the URL in the status bar at the bottom of the screen. Don't forget that to test the link you will have to activate your Internet connection. Again, use the View, Source option for a glimpse at the HREF tag that handles hyperlinks in the HTML code.

Bug alert! You may discover, like we did, that Composer has a funny way of randomly removing hyperlinks you create. If you experience this bug, we advise re-creating links just before uploading your page to the 'Net.

Speak Graphically. To add an image to the résumé, it's best to have a particular graphic on your hard drive. If you don't create your own graphics, you can find lots of cool images on the Web. (See "Get Graphics" sidebar.)

If you're a beginner, we recommend storing Web graphics in the same directory as your HTML files. This is because the HTML image tag requires a path that tells it where to locate a graphic; when HTML pages and graphics are in the same directory, the path is shorter. That keeps things simpler for beginners.

Composer's Insert command places the image tag for you. Again, it's easiest if you keep your résumé graphics in the same directory as the résumé itself. You might like to add a small photo of yourself adjacent to the E-mail address. It gives a quick name/face association that could help people remember you.

1. In the résumé, click where you'd like the image to appear.
2. Select Insert, Image.
3. In the Image Properties window, use Choose File and locate the graphic.
4. To wrap your E-mail address around your photo, select the box wrapping to the right of the image. Click OK.
5. It may take trial and error to get the right look. Double-click the image to return to the Image Properties box.

Another bug alert! You may find the address tag refuses to stay put. Get around this bug by inserting the italic tag instead; this isn't as proper as using the address tag, but it has the same visual result. Open your résumé HTML file in WordPad to complete your edits of the tags.

Get Fancy In WordPad. In general, WordPad provides more options for placing graphics anyway. For example, here's how you can replace HTML list bullets with your own. (Find free bullet graphics at one of the Web sites we recommend.)

Start WordPad and open the Resume.htm document. (If you don't see the file, change the Files Of Type to see All Documents.) Scroll down the résumé to the list item tag for Education. Remove the <LI> tag and replace it with an image tag, such as this:

<UL><IMG SRC="bullet.gif"> Education

In the quotes, type in the exact file name of your graphic. You simply can enter the graphic's file name when it's in the same directory as the Resume.htm file. Do the same for the Work Experience bullet.

To view changes in Navigator, first save the file as a text document with the .HTM extension. Then return to Composer and reload the page if you don't see your graphics. Then Preview.

Finding FTP

Here are two popular File Transfer Protocol (FTP) programs available on the Internet. Because they're **shareware**, you can try them both free, then purchase the one you prefer.

CuteFTP

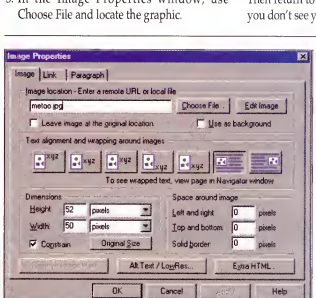
GlobalSCAPE Inc.
http://www.cuteftp.com
30-day evaluation. Register the software for $34.95.

CuteFTP provides good instructions for using the software on its Web site. Intermediate-level users will find CuteFTP easy to figure out. More experienced users will like this software's impressive features such as **macro recording** (which automates repetitive tasks) and full directory uploads.

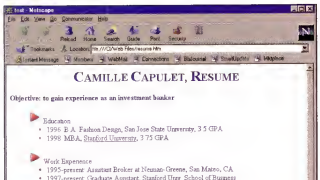
WS_FTP

Ipswitch Inc.
http://www.ipswitch.com
30-day evaluation. Register the software for $37.50.

Ipswitch claims its product, modeled after the Windows Explorer file manager, is especially designed for FTP novices. *WS_FTP* also has options for preventing the over-writing (copying over and deleting) of important files. □



Add graphics to your Web page using *Composer*. Use the Alt. Text option to include a description of the picture for people surfing without images.



Here's the final version of our sample résumé, ready for posting on the Web.

Be picky about your résumé, it is a public document. If you're not satisfied, try different bullet shapes or colors.

Alternative text. Graphics add spice to documents online, but many people surf the Web with graphics turned off in their Web browsers for speedier surfing. For this impatient audience, use the HTML ALT text element (ALT for "alternative"), which lets you type in a description of the image, giving the non-graphical users some idea of what should be on screen.

To add alternative text in WordPad, use the following codes:

<IMG SRC="my_pic.gif" ALT="Camille Capulet">

Obviously the names of your graphic and your name would replace the text in quotes in this example.

Add alternative text in Composer by right-clicking the image and selecting Image Properties. Then click the Alt. Text button in the Image Properties window. In Navigator, you can see the alternative text when you move the cursor over an image. Try it.

When you've sufficiently tweaked your résumé, you're ready to upload the Resume.htm file and its associated graphics to the Web. If your résumé page will be your main Web page (or the only one you're posting), rename it to Index.htm. Using this name for your home page shortens the Web address that users must type to reach your site. For example, if your page is named Index.htm, visitors can simply type something such as http://www.isp.com/people/~capulet (the address you'll get from your ISP) instead of adding an extra "index.htm" to the end of the address.

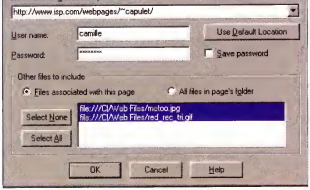
Upload Your Code. To get these things to the Web, you'll use the **File Transfer Protocol** (**FTP**). This is the standard method for moving files on the Internet, and Web designers use FTP utility software for this purpose. You may hear people use the acronym as a verb, as in, "I'm going to FTP my files to the Web." That's a fair use since it's exactly what you're going to do.

To transfer files to the Internet, you must have an account with an ISP and hard drive space on the ISP's Web server computer. Your ISP will give you an address, a kind of Internet path, to your private folder. It may look like this: www.isp.com/people/~capulet. Your ISP also will give you a user ID and a password for accessing the server.

The concept of an FTP utility program is simple. Think of it as a kind of file manager. The FTP utility helps you move files between directories and rename, delete, copy, and update files. Unlike a file manager, however, FTP is expressly for moving files between computers. You'll be sending your HTML files, as well as any graphics they require, to the server computer. If using FTP seems tricky, it's mainly because you're unfamiliar with the filing system on a remote computer. And if you're not careful with file transfers, it's easy to copy over and therefore delete important files. Because FTP can be confusing, we recommend having an experienced friend spot you at your first uploading session.

FTP with Composer. You can use a standalone FTP utility program or an FTP program built into a Web editor; Netscape's Composer has an FTP utility, for example. Here's how it works. Make sure you're connected while you execute the following steps.

1. Begin an FTP upload by clicking the Publish button.
2. Fill in the Page Title and HTML Filename fields. Use exact file names.
3. In the Location field, type in the Web server address your ISP provided.
4. Next you'll have to enter your user name and Password—also provided by your ISP. (Click Save password, and you won't have to type it again.)
5. Any graphics on the page are considered associated files. You can select a radio button to include these related files in the upload. (Or you could upload them separately.)
6. Click the All Files radio button to select any other files you'd like to upload.



To use *Composer's* FTP utility, you need some specific information from your Internet Service Provider including a Web server location, a user ID, and a password.

7. Click OK to send the files to your Web server.

To check whether your files are visible on the Web, you must open Navigator and point it to your Web site. This awkward system is a drawback to using Composer's FTP utility; if you can't see where you're actually placing files, it's way too easy to delete important ones.

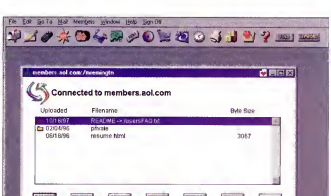
Other FTP programs. We prefer using a standalone FTP program. Most standalone programs for Windows provide views of your computer's files as well as the remote computer's files so you can see what you're doing. (See "Finding FTP" sidebar.)

FTP for America Online. If your ISP is America Online (AOL), you have it easy. Here's how you can upload your résumé file to the Web via AOL.

1. Log on to America Online.
2. From the Go To menu, select Keyword. Enter **my place** and press ENTER.
3. As you see, AOL provides instructions for FTP newbies. But it's really simple. Click Go To My Place. Here is your own private Web directory.
4. To upload your résumé file, click the Upload button.
5. Type the name of the file you want to upload, probably Index.htm, then click Continue. If you're uploading an image file, be sure the Binary radio box is checked.
6. Click the Select File button, then locate the file on your computer. If you created a Web Files directory, look there. Highlight the file, then click Open.
7. Finally, press the Send button. That's it. AOL also makes it easy to create directories as well as delete and rename files.

You should start feeling like a real Web player by now. You created a snappy résumé and posted it on the Web. But if you stop now, you'll make the mistake of many rookie Web designers. Competition from the hundreds of millions of Web pages available means your Web page can't be successful without advertising. Next month we'll show you how to broadcast news about your résumé across the Internet and use a few other marketing tricks to drum up interest in the site. Until then, keep an eye peeled for new employers. This is getting serious! ■

by Marti LaChance



Using FTP to upload Web pages in America Online is easy. Go to "My Place" and upload your Web files there.

Get Graphics

Hundreds of "free graphics" sites are available on the Web, but only a handful provide consistently good links and updates. Here is our shortlist. Most of these sites have been around for several years, which, in Web time, makes them venerable institutions!

Be sure to heed warnings or disclaimers posted at image sites you visit. Many sites require notification or a request a reciprocal link in exchange for using their graphics. Also keep this fact in mind: Nearly every image you see on commercial and personal Web pages is copyrighted, whether you see notice to this effect or not. And just because a Web author offers free graphics does not mean he is not violating copyrights of others.

Here are some ways to avoid violating copyrights when gathering Web graphics.

- When in doubt, ask permission to use another Web site's graphics.
- Use public domain clip art.
- Look for graphics on government-affiliated pages; works created for the federal government can't be copyrighted.

Resources for Icons, Images & Graphics
http://www.aphids.com/susan/imres

This site maintained by Susan Brumbaugh is perhaps the best graphics resource on the Web—a selective list of high-quality links to image banks, graphics software, and to graphics tutorials. Definitely check out her list of searchable image sites.

Yahoo!
http://www.yahoo.com

Get to Yahoo!'s collection of graphics sites via the Computers & Internet category. Click WWW/Page Creation/Design and Layout/Graphics. Among other things, you'll find choice tidbits such as the Online Logo Generator or Graphmaster's Girl Scout and Boy Scout images.

Randy's Icon and Image Bazaar
http://www.iconbazaar.com

This page may take awhile to download, but it's worth the wait. There must be thousands of images, all organized into logical sections that are fun to browse. Randy's even added a search engine to his site.

Web Graphics on a Budget
http://mardiweb.com/web

We love the free stuff on this site. You'll find fonts, backgrounds, buttons, and whole sets of color-coordinated buttons, lines, and cool left-aligned gradient backgrounds. If you want to learn to create your own graphics, this site has some excellent tutorials. □

Shopping For Portables

What To Expect In The Mobile PC Marketplace

You just cannot tie some businesspeople to a desk. They are movers and shakers, on the road meeting clients, in the air between appointments. Some spend less time in the office than anywhere else. Such on-the-go workers know their time out of the office doesn't mean there's any less work to do. Those reports, spreadsheets, and presentations demand attention wherever you are. That's where a portable computer can be the ultimate tool. Working on the plane, in the hotel, or even just at home for the weekend, a good portable computer can make a mobile professional's job more doable.

The benefits of portable computing aren't limited to the frenzied, three-days-a-week business traveler, though. Some people and companies are realizing even those workers who only travel on occasion can use portable computers. In fact, some firms are replacing desktop systems with portable ones so workers who do travel occasionally, or who need to work at home, can pick up their systems and go.

Debbie Way, product manager for retail products at portable computer maker Fujitsu, says the portable computers of today make it easier for desktop users to switch to the mobile counterparts. "The thing about portables these days is they are becoming very feature-rich, so people who are used to desktops don't have to have as much of the feeling they are giving up features by switching to a notebook. And notebooks offer users flexibility they cannot find with their desktops," she says. If you're on the move and need access to real computing power, a portable computer is a truly great tool.

It's important to note, however, that not everyone who can benefit from a portable computer should buy one. Some users never get used to the smaller, less comfortable keyboards and screens. Price is another major barrier. What you pay for a low-end portable can buy a desktop system with more speed and power. Despite technological advances and the hype of portable PC manufacturers, the best portable computer still cannot compete with the best desktop system. If you're comfortable with that reality, and sure a portable computer is for you, jump into the following list of things to consider before buying (or before trying to sell your boss on the idea).

Choices Galore. Portable computers account for about 19% of computer sales in the United States, says Mike McGuire, a senior industry analyst for mobile computing at the market research firm Dataquest. That percentage has remained about the same for the last few years, so portable computer manufacturers are fighting over a fairly finite piece of the pie. That's why there are so many types of portable computers from which to choose. The basic categories break down like this: premium (or desktop alternatives), mid-range, ultra-portable, and value (or entry-level).

What you need from a portable computer, and what you or your company is willing to pay, determines which category should get most of your attention.

A premium-class portable computer will include some of the best technology currently available in the portable market. It will also carry a big price tag (upwards of $4,000) and a hefty overall weight (some as much as 10 pounds). Kevin Lee, Fujitsu's product manager for corporate notebooks, says a premium portable computer, such as his company's 900 series, is for users who need plenty of computing power. "The 900 series is targeted at power users who are doing architecture drawings, World Wide Web and desktop publishing, graphics, and multimedia offerings. It's not the lightest notebook out there, but it's very full-featured," he says.

The entry-level machines, on the other hand, emphasize overall cost at the expense of speed, power, and other features. These machines contain older technologies and cost from $1,500 to $2,000. The mid-range machines are essentially a compromise between the high and low ends, with a mix of technologies that cost anywhere from about $2,000 to $4,000.

The last category is the ultra-portables. These are for folks who need portable computing power, but who want to travel lightly. McGuire says Dataquest categorizes ultra-portables as portable computers weighing from 4.5 pounds to 2.5 pounds, with no integrated media bay for a diskette or CD-ROM drive. Ultra-portable computers vary considerably in size, performance, and price, with some in the $2,000 range and others selling for considerably more. *(NOTE: Dataquest considers units such as the videocassette-sized Toshiba Libretto 70CT, called a mini-notebook by the manufacturer, an entry in the ultra-portable category.)*

Some people might point to Handheld PCs (HPCs) and palmtop computers as yet another portable computer category. We view this type of computer as separate from the rest of the portable computing world since the devices do not offer the computing power of a full-fledged portable computer. Several reasons for this exist. The first is that these machines do not run Windows 95 (Win 95) or Windows NT. Instead they run proprietary operating systems or Windows CE. Also, they do not have a hard drive, storing data instead in random-access memory (RAM). If you'd like to learn more about these devices, check out next month's *Smart Computing* for a review of the latest HPCs.

A mid-range portable PC will probably offer what was last quarter's top chip.

The Fujitsu 990Tx2 LifeBook, a premium portable PC.

■ **Choose Your Weapon.** To provide a better idea of the distinctions among portable computer categories, we have listed some of the features you'll examine when shopping for a system. Under each of these features we provide some idea of what you can expect to find in each category of portables.

We should point out this is a wildly imperfect science, as many portable computer manufacturers offer customized systems that let you mix premium features with value-priced ones. Also, between the time this issue goes to print and it reaches you, some of these specifications will doubtless change as the march of technology continues. In other words, these are guidelines, not hard-and-fast rules.

■ **Processors.** Users often single out the **central processing unit** (**CPU**, the computer's control unit or microprocessor) as the most important difference among portable computers. While this view is a bit simplistic, it is a good place to start.

The processors in portable computers are usually a step behind what you'll find in the latest desktop systems. That's because manufacturers cannot simply drop the latest desktop processor into an existing portable computer. Instead, they must wait for a special chip that deals with a portable computer's unique technical issues, such as space, power limitations, and heat dissipation. That's why Intel's latest chip, the speedy Pentium II, has just made its way to the portable market. And while you can buy a desktop PC with a Pentium II running at up to 400 megahertz (MHz), the fastest portable version still runs at only 266MHz.

If you buy a premium-priced portable computer, you can expect to find a 266MHz Pentium II processor onboard. An added bonus of buying a Pentium II-based portable computer is that some also offer **Accelerated Graphics Port** (**AGP**) technology, a new high-speed graphics technology that currently only works with the Pentium II.

A mid-range portable computer will probably offer what was last quarter's top chip, McGuire says. That means currently you will probably find a 233MHz or 266MHz Intel Pentium processor with MMX, (not a Pentium II).

Like many features in this category, the processors appearing in ultra-portables vary greatly. Fujitsu's 600 Series ultra-portables, for example, offer a 200MHz or 266MHz Pentium processor with MMX, while Toshiba's considerably smaller Libretto 70CT offers a 120MHz Pentium with MMX.

On the value side of things you will find processors as slow as a 166MHz Pentium with MMX on up to 200MHz or 233MHz. Some companies save costs by offering processors from Intel competitors Cyrix and AMD, so if the name on the processor is important to you, check before you buy.

■ **Display.** The screen also offers some glaring contrasts among models. Differences here have to do with quality as well as overall size. The best portable computer screens on the market are the **active-matrix** (or thin film transistor [TFT]) display. Individual transistors control every **pixel** (a tiny picture element) of an active-matrix screen, creating a very sharp image. Less expensive, and less advanced, is the **passive-matrix** (or dual-scan) display. This type of screen uses liquid-crystal display (LCD) technology. It's harder on your eyes (especially if you use it for a long time) and also less effective for making presentations.

Premium portable computers should come with a 13- to 14-inch active-matrix screen.

Mid-range machines also offer active-matrix, usually in a smaller screen size of around 12 inches. Ultra-portables vary greatly again, with some screens using dual-scans as small as 6 or 7 inches and others going with active-matrix as big as 12 inches. Finally, the majority of value portables offer passive-matrix screens in the 11- to 12-inch neighborhood, although decreasing production costs are bringing active-matrix to some of the better value-priced machines.

Memory. As with any computer, the amount of RAM in a portable system helps determine how fast it runs. But the amount of RAM a system ships with is not the only factor to consider. In fact, with the current low cost of RAM, most portable computer manufacturers are shipping their products with a healthy 32 megabytes (MB) of RAM.

Other areas, however, still differ among models, such as the type of RAM. In a premium notebook you should always find 32MB to 64MB of **Synchronous DRAM (SDRAM)**, the latest and fastest type of RAM. You should also find the ability to add more, with most letting you install and address more than 100MB. Such room to expand is critical as RAM is one way to keep your portable computer fresh and qualified for high-end computing as it ages.

Mid-range machines will also probably offer SDRAM, although the amount you can add may be less than 100MB. Ultra-portables and value models may offer SDRAM, or the older, slower Extended Data Output RAM (EDO RAM). Most will ship with 16MB to 32MB standard, but they may be substantially more limited in the amount you can insert later.

Multimedia. Another feature area where the categories differ is multimedia. A premium portable computer should offer at least a 24X CD-ROM drive. (The original CD-ROM drives operated at 150 kilobytes per second [KBps], represented by 1X. A 24X drive operates at 3,600KBps, a speed increase of 24 times.) Some of the more expensive models even offer **Digital Video Disc (DVD)** drive options. DVD, the next big step forward in multimedia, offers increased quality and a larger storage capacity than a CD-ROM.

While the premium machines tend to offer strikingly different multimedia tools, the differences between mid-range and the value-priced models are less drastic, with both offering CD-ROM drives around 20X.

nallest of the small, Toshiba's Libretto)CT offers 120MHz Pentium MMX pro- ɔssing power in a package roughly the ze of a VHS videocassette.

Ultra-portables, on the other hand, may not offer any drive. For example, to use a CD-ROM drive with the Toshiba Libretto you must do it externally, connecting through the machine's PC Card slot or parallel port. The Fujitsu 600 series ultra-portable, however, offers a CD-ROM drive in its included super-thin docking station.

Other Points To Ponder. While the above areas offer some of the most obvious differences within the portable computer categories, other areas reflect variations in cost and power as well. For example, a premium portable computer should offer a large hard drive, five gigabytes (GB) to 8GB. A mid-range or ultra-portable will probably offer something around 3GB to 4GB, while a value model will probably land somewhere between 2GB and 3GB.

Also, premium and mid-range portable computers tend to offer some network capabilities, which can be important in a business setting. More expensive machines generally offer the ability to warm or **hot-swap** modular components, which means you can switch components such as the CD-ROM and diskette drive without shutting down the system. Many value-priced portable computers require you to shut down the system before exchanging hardware.

One area that should be pretty similar, regardless of what type of portable computer you are buying, is the modems. With prices on 56 kilobits per second (Kbps) modems dropping, portable manufacturers are including them in products across the price spectrum. At worst, a very low-cost portable might show up with a 33Kbps modem.

One feature most shoppers would not think to consider, but which can vary greatly among the categories, is the warranty. Most value-priced portable computers include a one-year warranty (retailers, rather than the manufacturer, often prefer to offer extensions to this one year). The premium systems offer up to three years. Also, technical support options may vary.

Think Ahead. While you'll find some compromise between price and performance, don't let an extra 50 bucks stop you from getting closer to what you want. One of the biggest drawbacks to portable computers is they are notoriously difficult to upgrade. Aside from adding some extra RAM, exchanging drives in a modular bay, and adding peripherals through a PC Card slot, what you buy is what you get. So if the screen is too small for comfort, the processor is a bit slow, or the touchpad input device is buggy, think carefully about whether you want this unit. You and this portable computer will probably be together for some time, so make sure you can live with your choices.

Finally, now that you (or your company) just dropped a cool $2,000 to $5,000 on a portable computer, you need to spend a little more to protect that investment. Your final purchase should be a good computer carrying case. Why? Because there's nothing worse than watching a portable computer, and all the data it contains, go crashing to the ground with nothing to break the fall. Make sure you get a case with enough protection. Different manufacturers use different methods. Some use foam padding, others install inflatable air bladders, and still others use a hanging sling. Whichever you choose, make sure it is a reliable bag with a sturdy strap. The best portable computer in the world is not worth much if it takes an unprotected tumble. ■

by Tom Mainelli

Lotus 1-2-3 5.0

Make Worksheets Look Great

5.0 FOR WIN

SPREADSHEETS

When you begin creating a worksheet, your focus is usually on entering the data correctly and learning some basic spreadsheet functions. Those are important first steps, but creating an effective worksheet involves something else: your data's appearance.

Lotus 1-2-3 lets you change worksheet fonts, alignment, and attributes such as bold or italic text. You also can add borders, lines, shading, and color. These enhancements can draw attention to specific data, make information easier to read, and make your worksheets more presentable.

Change the appearance of your data by selecting a cell or range of cells, clicking the Style menu, and then selecting Font & Attributes, Lines & Color, or Alignment. The same options are available by right-clicking a cell range and making a selection from the drop-down menu. Select Style and Worksheet Defaults (Style, Worksheet Defaults) to set the font, alignment, and other attributes for the entire worksheet.

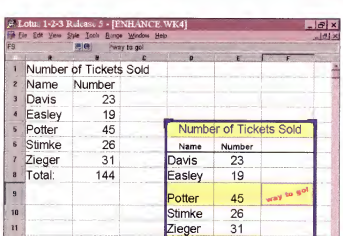
Fonts & Attributes. A typeface is a particular type style (a design for a character set), such as Times New Roman. Typefaces can have different attributes, such as italic or bold, and are available in various point sizes, which describe the character height.

To change font and attributes, position your cursor and select Font & Attributes from the Style menu. Change the settings in the dialog box as desired. If you select Underline, specify an underline style in the drop-down box. As you select a different typeface, size, attributes, and color, the sample changes to show you the appearance of the text.

Lines & Color. Emphasize data by adding frames, borders, and colors to selected cells. To access the dialog box, click Style, Lines & Color. The sample box will reflect any changes you make.

The settings in the Interior section of the dialog box let you select a background color, pattern, pattern color, and text color. You also can choose to display negative values in red. The background color is the color that fills a cell, which is white by default. If you select a pattern, it will display in black unless you choose a pattern color. If you have already applied a text color using Font & Attributes, that color will appear in the Lines & Color dialog box, unless the selected range contains more than one text color.

Use the Border section to apply a border on all or some of the sides of the cell or range. If you want to outline all the cells in a selected range, as if they were one object, choose Outline. If you want to outline individual cells within a selected range, click All. A variety of line styles and colors are available to accent your border, or you can select a designer frame.



Plain text and numbers do the job, but additional formatting makes your *Lotus 1-2-3* worksheet more eye-catching.

Alignment. By default, labels are aligned to the left of the cell and values (numbers and formulas) are right aligned. To change alignment, select a range and then click Style, Alignment. The settings in the dialog box will let you specify horizontal and vertical alignment, orientation, and word wrap.

Use the settings in the Horizontal section to designate data alignment across the width of a cell. The General option is the same as the default. The Evenly Spaced option adds spaces if necessary so label entries fill the cell from edge to edge; numbers or labels ending with a period, colon, question mark, or exclamation mark are ignored. The alignment you choose is relative to the column width of the cell, unless you check Across Columns, which means it is relative to the width of the selected columns.

Settings in the Vertical section align data at the top, center, or bottom of a cell. This is useful if there was a row height extension or when there is a small font used in a particular cell.

If you've a large section of text you don't want to extend across columns, wrap it to the next line(s) by selecting the Wrap Text option. This will wrap text automatically, increasing the cell height if necessary.

Use the options in the Orientation section to change the orientation of data. These options let you display data vertically instead of horizontally. You also can rotate data by selecting the last option in the drop-down list and then specifying the degrees of rotation.

If you use the DELETE key to delete an entry, the styles you have specified will remain. If you want to also delete the style, choose Clear from the Edit menu and indicate whether contents, style, or both should be cleared from the selected cell(s). ■

by Diane Kaye Walkowiak, M.A.

Microsoft Excel 97

Jazz Up Worksheets With Clip Art

icrosoft Excel workbooks tend to be factual, bottom-line documents—so bottom line that they are also dry as dust. You can spiff up almost any workbook, however, by adding electronic pictures, or **clip art**. You can use clip-art images to emphasize key information, reinforce main ideas, or to persuade people to read your worksheet. Excel 97 provides ready access to the Clip Gallery, a central location for all *Microsoft Office* 97 clips, as well as the ability to insert pictures from files. There are several quick-and-easy ways to work with clip art to enhance your worksheets.

■ **Get Ready To Go.** Before you use the Clip Gallery, make sure you can access it without problems. If the Picture, Clip Art command is unavailable in the Insert menu, the Clip Gallery is not installed. To install it, insert your Office 97 CD-ROM into the diskette drive; then click the Windows Start button, and choose Settings, Control Panel. In Control Panel, double-click the Add/Remove Programs icon. On the Install/Uninstall tab of the Add/Remove Programs Properties dialog box, click Microsoft Office 97 and then click the Add/Remove button. Click OK to confirm that the CD-ROM is in the drive. In the Microsoft Office 97 Setup dialog box, click Add/Remove. Click Office Tools in the Microsoft Office 97 Maintenance dialog box, then click Change Option. Check the Clip Gallery box in the Office Tools dialog box; then click OK (if you want to include a few sample clip-art files, check the box for Popular Clipart as well). Click Continue in the Microsoft Office 97 Setup dialog box. Finally, click the Restart Windows button to finish the installation.

By default, the Clip Gallery contains only a few clips. Many more are available, however, on the Office 97 CD-ROM. If you want to use the clips regularly, it pays to put the CD-ROM in the drive before accessing the Gallery.

You also can add additional clips to the Gallery by importing them from the Office 97 CD-ROM or another source, such as a commercial clip-art collection. First, display the Clip Gallery. Click the Import Clips button to show the Add Clip Art To Clip Gallery dialog box. Locate and select the file you want to add; then click Open. In the Clip Properties dialog box that appears next, you can check the categories to which you want to add the clip.

■ **Clip Insertion.** To insert a clip from the Clip Gallery, choose Insert, Picture, Clip Art. In the Clip Gallery click the Clip Art tab and then scroll through the list of available images. You also can enlarge the clip for better viewing by checking the Magnify box. If the number of clips on your system is particularly large, you can narrow the search by selecting a category to limit the display to a specific type of clip. (For example, you could click the Animals category.)

After you find the clip-art image you want, select it and click the Insert button. Replacing one image with another from the Clip Gallery is also easy because the clips are technically embedded objects. Just double-click the clip to redisplay the Clip Gallery and then double-click the new, replacement image.

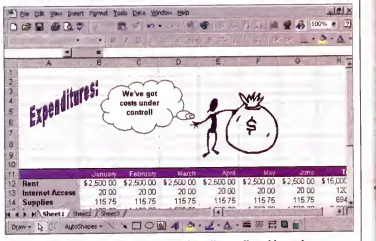
Alternately, you can insert a picture from a file. To do this, choose the Insert menu's Picture option, then From File. Locate the file you want in the Insert Picture dialog box. The CLIPART folder on your Office 97 CD-ROM contains a wealth of pictures, for example. Select a file and click Insert. Pictures inserted from a file aren't embedded objects, however, so double-clicking them displays the Format Picture dialog box—not the Clip Gallery.

■ **Making Some Adjustments.** Once the clip art is in your worksheet, you can change its size and location. Click the image to place white selection handles around it. Place your mouse pointer in the middle of the image and hold it down while you drag the image to its new location. To resize the image, select it; then place your mouse pointer over any white selection handle until it displays as a two-headed resizing arrow. Drag to resize.

You also can change formatting for a picture by using buttons on the Picture toolbar, which automatically appears whenever you select an image. Finally, if you want to completely remove a clip-art image from a worksheet, click to select it and then press the DELETE key on the keyboard.

So have a little fun with your worksheets—add a picture or two! ■

by Linda Bird



Dull worksheet? Add some snap to it by inserting a clip-art image!

Web Browsers

Printing World Wide Web Pages

The flickering, electronic face of the World Wide Web conveys plenty of facts, but sometimes users need to see information on paper. Popular Web browsers offer a way to translate what we see on the screen to something we can hold in our hands via the Print command.

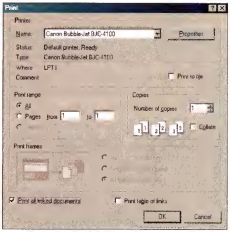
Internet Explorer. *Microsoft Internet Explorer 4.0* offers a range of options for printing Web pages. First, look under the Page Setup option in the File menu. This lets you choose **landscape** (longer from side to side) or **portrait** (longer from top to bottom) orientation for print jobs. Most Web pages are set up for viewing in normal portrait proportions, but some documents may look better in landscape mode.

You also can change margins here and header and footer information. The codes for headers and footers represent various date and time formats for the most part. By default, Explorer prints the window or page title and the page number along with total number of pages. In the footer we find the **Universal Resource Locator** (**URL**, or Web page address) and date. To change these codes, click the question mark button at the top-right corner of the window, then click the Headers & Footers box. A help screen appears with a list of all the codes and their definitions.

The actual Print dialog box is similar to those found in other programs such as word processors. Users can select the printer to use with the drop-down list at the top and click the Properties button to change various printer settings. This might be a good place to check whether you have a color printer. Most Web pages include graphics and photos that can quickly use up color cartridges if you print enough of them. When you do not need the color, go into Properties and switch your printer to grayscale if possible.

Print Range tells Explorer how many printed sheets you want to produce. Leaving the default All selection tells the program to print an entire Web page from top to bottom. The computer will automatically break for new pages where necessary and continue printing one after the next. If you know that the information or graphic you need to print is toward the top of the Web page, click the Pages button instead and select "from page 1 to 1," "1 to 2," or whatever seems like a reasonable choice.

The last option, Selection, is perhaps the most handy. Users can highlight the text that interests them in the browser window, then choose this button to tell the program to print only that text.



The Print dialog box in *Internet Explorer 4.0* gives users numerous options for producing hard copy versions of World Wide Web pages.

The Print Frames area comes into play for users visiting a Web page incorporating **frames**. These are the sometimes helpful, sometimes annoying devices that let page designers incorporate individual windows of content in the same page. In effect, multiple Web pages appear at the same time, which in the past led to obvious printing problems. Explorer offers three frame options. The page prints as it appears on-screen, with the frames arranged as a user would see them; selected frames print alone; or each frame prints individually as if each one was a separate page. For most jobs, the first option is probably the best.

Two additional print commands round out the menu. Putting a check mark in Print All Linked Documents will send the browser into a printing frenzy, sending to the printer not only the page displayed on-screen but every page linked to it. Depending on the page in question, this is not a command for those low on **toner** (the powdery substance used in laser printers). Some Web pages link to scores, and sometimes hundreds, of others. The second option prints a table listing all the links along with the pages themselves.

Navigator. One area where the popular *Netscape Navigator* browser lags behind the times is its printing capabilities. Pulling up the Print dialog box in Navigator produces only the barest of options. The program includes the Print Selection command, but it lacks some of the other useful features of Internet Explorer.

Choosing Page Setup in the File menu offers a few more options such as margins, header, and footer adjustment. Page Options lets users specify black text on their printouts for greater legibility in the translation to paper. Netscape also has a print preview screen unavailable in Explorer that shows what printouts will look like.

Using either browser, be prepared for print jobs that are not quite as predictable as what flows out of a word processor. Web pages are for the virtually unbounded screen rather than standard-sized paper, so there are some adjustments to make. The browser may rearrange the page a bit to fit paper proportions. On top of that, we found none of the clickable hyperlinks work on printed versions.

Maybe the screen isn't so bad after all. ■

by Alan Phelps

Going Online

Rule Your Inbox

E-mail is so efficient it can quickly bog you down. If you have ever left your desk for a few days or even just a few hours, you know how quickly the old Inbox can fill up and spill over. Dozens or even hundreds of messages await businesspeople on vacation right now, piling up in a mass that takes valuable time to untangle. Fortunately, the popular E-mail programs (also called **clients**) of today can help begin the organizational process through rules or filtering commands.

■ **Outlook Express.** Microsoft's free *Outlook Express* E-mail program, part of the *Internet Explorer* suite, includes a feature-rich rules function. To take it for a spin, select Inbox Assistant from the Tools menu and click Add.

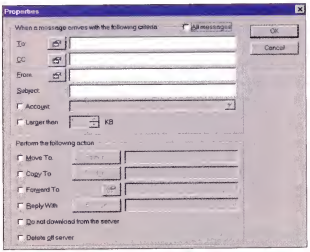
First off, determine which messages the rule will affect. Click the All Messages box to have the rule apply to every E-mail message that comes through the door. Among the other choices are rules based on particular recipients (To:), senders (From:), who besides you received the message (CC:), text in the subject line (Subject:), and from which E-mail account they were retrieved (Account:).

The most frequently used option is probably the From: box. Clicking the address-card button brings up a list of people in your address book. The rule you create will affect messages from all the people whose names you click.

The second half of the dialog box lets users determine what happens to messages caught by the rule net. Outlook Express offers a fairly robust set of options you do not always find, even in programs that cost money. The Move To command will send the message to a specific E-mail folder. Copy To copies the message to that folder while leaving the original in the Inbox.

Forward To is a fun choice that will automatically send off copies of selected incoming mail to other people—or even to another E-mail address of your own. You might try this option to run a simple discussion list. All mail that comes in with a certain word in the subject line could be forwarded to multiple people. Reply With will fire off reply messages you can create to deal with certain recurring situations.

The last two check boxes will affect mail before it even reaches your machine. People who access a single E-mail account from two computers might use Do Not Download From Server to control which system downloads particular messages. Delete Off Of Server can quickly dispatch junk E-mail if you can identify a common element to program into the first section of the rule dialog box.



The mail rules in *Outlook Express* can help keep Inboxes from becoming hopeless masses of E-mail.

Note that multiple rules can apply to the same incoming message. For example, a message might be from a rule-selected person and might also have a rule-targeted subject line. Outlook will apply its rules in the order you set in the Inbox Assistant dialog box. Change priorities with the Move Up and Move Down buttons.

■ **Netscape.** The *Netscape Messenger* E-mail client includes a similar rules feature called Mail Filters. The filter dialog box is available under the Edit menu. Click the New button to set up a new rule.

Netscape first asks that the filter be given a name. Type in something descriptive, then use the drop-down boxes below to create rules. The second drop-down box lets you build rules based on what a subject or message body contains and what it does not contain. The More and Fewer buttons allow the creation of complex rules with multiple conditions.

As in Outlook, once you have a rule set up to catch certain E-mail, the next step is to decide what happens to those messages. Netscape does not provide quite as many options as Outlook. The standard command for moving mail to specified folders is present, but you cannot automatically forward or reply to E-mail. There is a delete command for ridding yourself of unwanted mail and a command to set mail priorities so you are alerted to the most important messages. Finally, a radio button at the bottom turns the rule on or off.

Click OK to return to the list of filters. Use the two arrow buttons to move rules up or down in priority. The Log Filter Use check box offers a way to keep track of the operation of various rules. If you have many rules, the log would be a good troubleshooter for making sure mail is moving the way you want.

In Outlook and Messenger, rules apply only to newly incoming E-mail. That means an Inbox that is already frightfully full must be dealt with the old-fashioned way. Once you construct a set of rules, however, mail will start sorting itself into folders, be tossed in the delete bin, or be forwarded away without a single mouse click by the user. That is the kind of useful information you might want to send in an E-mail message to everyone in the entire office. ■

by Alan Phelps

Microsoft Word 97

Creating Mailing Labels

Why address envelopes by hand when you easily can set *Microsoft Word 97* to print great-looking mailing labels? This word processor can format and print several kinds of popular-sized laser and inkjet labels for envelopes, file folders, diskettes, name tags, index cards, and postcards. It even does custom label sizes.

Time-saving shortcuts direct Word 97 to print a label for a selected name and address. Simply open a document, then drag the pointer across a name and address you want to place on a label. Choose Envelopes And Labels from the Tools menu (Tools, Envelopes And Labels), then click the Labels tab in the dialog box. Word 97 copies your highlighted information to the Address box of the Labels tab window. To modify all or part of this information click the pointer in the text, press BACKSPACE to delete unwanted characters, and then type new data.

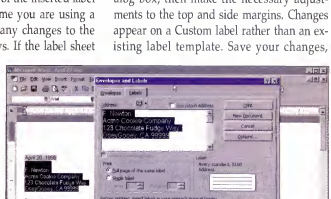
To customize the way Word 97 prints an address displayed in the Labels tab Address window, click Options. Identify your printer in the resulting dialog box. Confirm which tray will hold the blank sheet of labels, then specify the label product for this print job. Word 97 supports several Avery label products, plus templates for MACO, Hewlett-Packard, and Inmac labels. Information about the label selected in the Product number window appears in the Label Information section.

If your label product does not appear in the Product number window, click Details to create a custom label template. Enter information about the label's top and side margins, height and width, and distance between labels. Indicate how many labels span across and down the sheet. You must also specify the **vertical pitch** (distance from the top edge of one label to the top edge of the next) and **horizontal pitch** (distance from the left edge of one label to the left edge of the next). Name this label and click OK. Your custom label appears as an option in the Product Number window. Click OK again to return to the Labels tab.

Get It In Print. To print a single label rather than a Full Page Of The Same Label, click the Single Label option in the Print section of the Labels tab. By default, Word 97 prints to Row 1, Column 1 of the inserted label sheet. If this is the first time you are using a label sheet, do not make any changes to the Row and Column windows. If the label sheet is missing labels, you can ensure that Word 97 does not print to any of the blank spots by configuring Row and Column settings. Be careful when inserting partially used label sheets in laser printers. If they tend to jam, you may be better off printing from a completely new sheet, reserving unused labels for other jobs.

If you use Avery labels, you can ensure they print correctly by using a special Avery Wizard designed to work with Word 6 (Windows 3.1), Word 7 (Windows 95), or Word 97 (Windows 95). Version 2.0 of this helpful applet is available for free downloading from the Avery World Wide Web site (http://www.avery.com/prod_catalog/software/index.html). An earlier version ships with Word 97 in the VALUPACK folder on the *Microsoft Office 97* CD. After setup, you can run the Wizard from Word 97 by clicking the Avery button on the Standard toolbar in Word; by choosing Tools, Avery Wizard; or by clicking File, New, then double-clicking the Avery Wizard on the Avery products tab. It is also available by choosing the Avery Wizard in Avery Products on the Start menu of Windows 95.

Before printing to label stock, print to an ordinary 8.5-inch by 11-inch sheet of paper to verify the text is centered. Place the printed "comp" under a sheet of blank labels. Align both sheet edges, then hold them up to a light or a window. If output appears too high or too low, or text seems too far left or right, select the Options button on the Labels tab in the Envelopes And Labels dialog box, click the Details button in the Label Options dialog box, then make the necessary adjustments to the top and side margins. Changes appear on a Custom label rather than an existing label template. Save your changes, then run another print test. When output on regular paper centers correctly, insert a sheet of blank labels, then click the Print button.



***Word 97* can automatically turn highlighted information in an open document into the address on a label ready for printing.**

Return To Sender. The Labels tab in the Envelopes And Labels dialog box has a Use Return Address option. Click its box to place a checkmark there. Now Word 97 prints one label or a sheet of labels containing the return address specified in the User Information window. (To configure User Information, click Tools, Options; click the User Information tab; then enter data in the Mailing Address window.) Be sure to print a test run before printing to label stock. ■

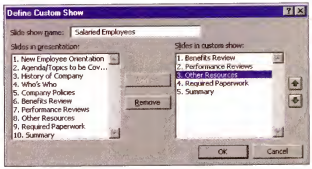
by Carol S. Holzberg, Ph.D.

PowerPoint 97

Create Custom Slide Shows

97 FOR WIN95

here is no reason to start a new presentation for every audience when you can easily customize an existing presentation to fit each group. The new Custom Shows feature of *PowerPoint 97* makes this easy. You can use this feature to create variations of a main presentation so you can jump quickly to information pertinent to a specific audience.



The same set of slides turns into a variety of presentations with the Custom Shows feature.

For example, presentations for hourly employees and salaried workers at the same company may be nearly identical, except for different information that needs emphasis at a certain point in the slide show. Using the Custom Shows feature, you can show the same beginning slides to all employees, then branch to an appropriate custom show for each group. This saves time and effort and allows you to keep several customized versions of the same presentation in one file.

We will show you the basics of creating, editing, and running custom slide shows. Next month we will expand your knowledge by showing you how to use hyperlinks to quickly access custom shows.

■ **How To Customize.** Your first step in creating a custom slide show is developing all the slides you might want to include—either in the basic slide show or in any custom shows. It usually works best to place the slides you want to show all audiences at the beginning of the presentation.

When you have the slides in place, open the Slide Show menu and choose Custom Shows (Slide Shows, Custom Shows) to display the Custom Shows dialog box. Click the New button to display the Define Custom Show dialog box. Enter a unique name (up to 31 characters long) for the custom show, such as Salaried Employees or Hourly Employees.

Next, add slides from your presentation to the custom show. Add a single slide by double-clicking it on the Slides In Presentation list. This moves the slide to the Slides In Custom Show list. For even greater efficiency you can add multiple slides to the custom show all at once. First, select adjacent slides by clicking and dragging over them with the mouse; select non-adjacent slides by pressing CTRL while clicking them. Then click the Add button to include them in your custom show.

After you add slides to the Slides In Custom Show list, you can change the order in which they appear by selecting the slide you want to move and then clicking the Move Up or Move Down buttons (the Up and Down arrows).

When you finish adding slides to your custom show, click OK to close the Define Custom Show dialog box. To see how your new show looks on the big screen—or at least your computer's monitor—preview it by clicking the Show button in the Custom Shows dialog box. Advance through the on-screen show as usual—by left-clicking the mouse button—until it ends and the Custom Shows dialog box reappears. If you are happy with the order and composition of the show, click the Close button in the Custom Shows dialog box.

■ **Run The Show.** After you set up your custom show, you can branch to it during an actual presentation by using the Slide Show shortcut menu. Click the Slide Show button to display your main presentation as an on-screen slide show. Advance through the presentation until the slide from which you want to branch appears. Right-click to display the Slide Show shortcut menu and then choose Go, Custom Show. Choose the name of the custom show from the submenu. Advance through the custom show by clicking the mouse or pressing ENTER.

■ **The Editor's Touch.** It's easy to make revisions to a custom show by adding or removing slides or by changing the order in which they display. To make changes to a show, choose Slide Show, Custom Shows. Select the name of the custom show you want to revise and click the Edit button. Add more slides to your show by selecting them on the Slides in Presentation list and clicking Add. Remove slides by selecting them on the Slides In Custom Show list and clicking Remove. When you finish making revisions, click OK to close the Define Custom Show dialog box.

Finally, to delete an entire custom show, click its name in the Custom Shows dialog box then choose Remove. Remember that no matter how much you change a custom show by adding or removing slides, the slides themselves are still part of the underlying presentation.

Practice creating and editing a few custom shows. When you master these skills, you'll be in shape for next month's PowerPoint project when we focus on creating hyperlinks to custom shows and other sites. ■

by Linda Bird

HTML

Creating Graphical Links

To make your World Wide Web pages more interesting, use graphics to anchor your links rather than text. This way instead of clicking text, your visitors click graphics to visit linked Web pages. You can create graphical links to another page on your site, one on someone else's site, a sound file, an E-mail address, or another graphic.

(*NOTE: For the basics on using Hypertext Markup Language [HTML] to build a Web page, see "Build A Web Site, Part 1" in the July issue of Smart Computing.*)

Link Your Home Page. Use the following tag to link an image to your site's home page. Here the image Home.gif has been linked to our site's home page:

```
<A HREF="index.htm"><IMG
SRC="home.gif" BORDER = 0
ALT="Return to Home Page"></A>
```

This tag assumes your home page is called Index.htm and you have an image called Home.gif on your site. A visitor viewing a page with this link will see the image Home.gif on-screen. If the person selects it by clicking it, he will move to the Web page called Index.htm. Just change the file names to fit your image and home page.

Using "BORDER=0" removes the border from the image. While this improves the look of your page, your visitors may not recognize the image as clickable. Help them by selecting an easily understood picture such as a button, an envelope for an E-mail link, or a house for a home page. Also, add some text to indicate your image can be clicked. For example:

```
<A HREF="index.htm"><IMG
SRC="home.gif" BORDER = 0
ALT="Return to Home Page"></A> Select
this image to return to my home page.
```

The ALT attribute in the IMG tag tells visitors browsing with images turned off what the image represents. This is also useful for visitors who use speech-based browsers because they will hear the ALT text read aloud. Normally, users will have their browsers set up to display images and will not generally see the ALT text.

Create An Outside Link. When you are linking to a page on your own site you only need to include the page name in the link. When you link to someone else's site, however, you must use their full Universal Resource Locator (URL, a site's address).

```
<A HREF="http://www.smartcomputing
.com"><IMG SRC="sclogo.gif" BORDER = 0
ALT="Smart Computing's Home
Page"></A>
```

This example assumes your site has the *Smart Computing* logo in a file called Sclogo.gif. When your visitor selects the image they will move from your site to *Smart Computing's* site at http://www.smartcomputing.com.

Using Thumbnails. Placing large graphics on your page increases its loading time. Unless you really need the picture on the page, give your visitors the option of loading it. Create a small version of your image using graphics software or use a simpler image and link this to the larger image:

```
<A HREF="largecat.jpg"><IMG
SRC="smallcat.jpg" BORDER = 0 ALT="Link
to a picture of my cat"></A>Click to see a
photo of my cat (20 Kb).
```

Here the small image, called Smallcat.jpg, will appear on you page. If a user clicks this image, the window will clear, and a second image called Largecat.jpg will be displayed.

Stating the image size lets your visitor calculate its download time. You can find the image size by locating the file using Windows Explorer (Windows 95) or File Manager (Windows 3.1) and reading its size from the screen.

Famous Landmarks [Big Ben.] [White House] [Opera House]

Removing the border from a graphic makes it look neater, but unless your visitor's mouse is over the image it is not immediately obvious that the image is clickable.

Linking To E-mail. Your visitors can send you E-mail messages directly from your Web site with this handy link:

```
<A HREF ="mailto:myid@myserver.com">
<IMG SRC="letter.gif" ALT="E-mail me"
BORDER=0></A>
```

Replace myid@myserver.com with your E-mail address and Letter.gif with the file name of a suitable image such as an envelope or a post box. When your visitors click the image, their browser's E-mail program will open with your E-mail address already in place. ■

by Helen Bradley

WordPerfect 6.1

Time-Saving Macros

or all the convenience they offer, macros remain an underused *WordPerfect* feature. If you shied away from them because they sound too difficult, this article is for you. Once you learn the basic steps of creating a macro, you will enjoy the convenience they offer.

A **macro** is a series of keystrokes and commands you can record, save, and then replay whenever needed by pressing a few keys or entering a macro name. Macros can be highly complex and sophisticated, or they can be quick, easy operations that perform simple but repetitive tasks. They can save you time formatting documents, typing often-used text, or performing routine operations.

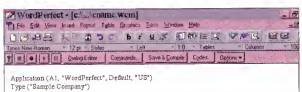
The Key Combo. To create a macro, you tell WordPerfect to start recording your steps. Then you perform the actions you want the macro to repeat, at the end of which you stop recording. Decide exactly what the macro should do and the steps necessary to do it before you begin recording.

To begin, select Macro and Record from the Tools menu (Tools, Macro, Record). In the dialog box, select a directory and enter the name for the macro. You will need this name whenever you want to use the macro. The addition of the file extension .WCM is automatic. If you want to be able to play the macro by pressing a keystroke combination, such as CTRL-SHIFT-A, give the macro the name of Ctrlsft*letter*.wcm. Choose Record, and the macro will begin recording your actions, including text and commands you type from the keyboard and selections made with the mouse. When you complete the actions, select Tools, Macro, Record to stop recording, or click the Stop button on the Macro Feature Bar.

To play the macro, choose Tools, Macro, Play. Type the name of the macro you want to use and select Play. The macro will run, repeating the recorded actions. If you save the macro as a key combination, play the macro by pressing the appropriate keys, such as CTRL-SHIFT-A.

A Sample Macro. To create a macro that enters a company name and address, click Tools, Macro, Record. Enter the filename **cname.wcm** and click Record. Type the following information:

Sample Company
123 Main Street
Anywhere, NE 66666



We edited this original company name macro (above) to include the codes shown on the right so the text of the macro was centered and in bold.

```
Application (A1, "WordPerfect", Default, "US")
Center ()
AttributeAppearanceOn (Attrib  Bold!)
Type ("Sample Company")
HardReturn ()
Center ()
Type ("123 Main Street")
HardReturn ()
Center ()
Type ("Anywhere, NE 66666")
AttributeAppearanceOff(Attrib  Bold!)
```

When you finish typing, select Tools, Macro, Record to stop the recording. To play the macro, select Tools, Macro, Play and select the macro called Cname.wcm. It will print the text you typed into the macro. Suppose you decide the text looks too plain and you want it centered rather than left justified. You can record the macro again, replacing the old file with the new keystrokes, or you can edit the macro.

WordPerfect saves macros as document files, so you can edit and save them. When editing a macro, you should be familiar with available macro commands and their proper syntax. Click Help, Macros, Macro Command Index for more information.

To change an existing macro, select Tools, Macro, Edit. Enter the filename of the macro you want to edit and click Edit. When you finish, select Save and Compile or Options, Save As Macro from the Macro Feature Bar to save your changes and then choose Options, Close Macro to clear the screen.

Assume you wanted to bold and center the company name and address in our previous macro. Click Tools, Edit and select the macro Cname.wcm. The macro file will open so you can view and change its contents. The illustration on this page shows the original file and the file after we made changes to bold and center the text.

Note the addition of the centering and attribute commands. Instead of repeating the Center () commands for each line, you could use Justification (Center!) or JustifyCenter (), but if text were entered after the company name, that text also would be centered.

Powerful Features. Although the basic macro we just created and edited may seem relatively easy, macros can be quite complex. You can use the Dialog Editor button on the Macro Feature Bar to create custom dialog boxes within a macro. For example, in a letter macro that enters the beginning and ending of a letter, this would let the user select from multiple options, such as different salutations or closings. You also can create macros that find and replace WordPerfect codes. To insert the codes, use the Codes button on the Macro Feature Bar.

WordPerfect includes several macros in the default C:\OFFICE\WPWIN\MACROS directory. You can read a brief description of what each macro does by choosing Help, Macros, Additional Help, WordPerfect Macros. Run some of the sample macros to see how they function; edit them to display their command structure. This gives an idea of the construction of more complex macros. ■

by Diane Kaye Walkowiak, M.A.

Quicken Deluxe 6.0

Investment Tracking, Part I

6.0 FOR WIN

PERSONAL FINANCE

Tracking your investments is important for two reasons. You need to make sure your money is being used to the fullest, and you need to accurately track profits and losses for that nasty five-letter word: taxes. Proper tracking of gains and losses will help you avoid a nastier five-letter word: audit.

You can easily track the performance of your mutual funds, stocks, bonds, and IRA accounts through *Quicken Deluxe 6.0*. This month, we discuss methods of tracking mutual funds through Quicken (the other investments follow similar steps). In the second part of this series next month, we'll discuss using Quicken Live for investing.

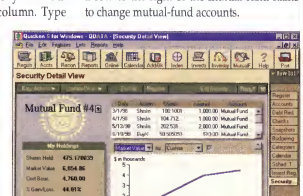
Mutual Funds. First let's set up a mutual-fund account. Click the Lists menu followed by the Account command. In the Account List window, click the New button. In the New Account window, click the Investment radio button and click Next. Type a name and a description for the account in the appropriate boxes and click Next. The following window then asks whether you can write checks from the account. We recommend you choose No in this window. Because this account tracks profits and losses for investment purposes, we only want to track dividends earned and shares purchased and sold.

In the next window, click the One Mutual Fund button and click Next. It's probably best to set up separate accounts for each mutual fund. In the next window, mark No if the account is not tax-deferred (we will discuss these types of accounts later) and click Next. Double-check your entries in the Summary window. Now click the Tax Info button. You can link any transfers into and out of the account to the correct tax form by clicking the drop-down menus and making a selection. Click OK and click the Done button.

Now Quicken will ask you to enter the tracking symbol for the mutual fund; then click the OK button. In the Account List window, you will now see your new mutual fund account. Double-click the name of the account. Quicken may request that you enter the number of shares you own and the current price per share in the Create Opening Share Balance window. (*NOTE: This window sometimes doesn't appear.*) For tax-tracking purposes, however, it's best to skip entering this information. Click the Cancel button to move directly to the account's register window.

Now enter your initial purchase of mutual-fund shares into the register. Type the date of the purchase in the Date column. In the Action column, type **ShrsIn** to list your initial investment. Skip the Security column. Type the price per share in the Average Cost/Price column. (The name of this column can change, depending on entries you made earlier.) Now enter the number of shares you purchased in the Shares column, or, if you don't know the exact number of shares, enter the total amount you paid in the Basis box. Quicken then will calculate the number of shares. Click the Enter button when you finish.

As you buy and sell additional shares, enter the information on a new transaction line. In the Action column, use BuyX when you purchase shares and SellX when you sell shares.



***Quicken* will display a graphical representation of your mutual fund account's progress through its Detail View window.**

Easy Actions. To enter distributions from a mutual fund, click the Easy Actions button in the register window. If you choose to reinvest the income into additional shares of the mutual fund, click the Reinvest Income command. If you want to deposit the money into one of your accounts, click the Record An Income Event command.

In the Reinvest Income window, enter the amounts of the dividend and any capital gains. Then enter the number of shares you purchased with the income. Click OK. Quicken will transfer the information to the mutual fund's register.

In the Record Income window, be sure to enter the date the distribution was issued (using the correct date is important for tax purposes). Type the amounts of dividends and capital gains in the correct boxes. In the lower-left corner of the window, click the drop-down menu in the Transfer Account box to select the account into which to enter the dividend and click OK.

You can view a graphical representation of your mutual-fund account by clicking the Detail View button. Click the drop-down arrow to the right of the mutual fund name to change mutual-fund accounts.

Tax-Deferred Investments. You can decide whether to use Quicken to track tax-deferred investments, such as a 401(k) plan or an IRA. Because the profits are tax-deferred, you do not need Quicken to compute the profits on an annual basis.

When you remove profits from a tax-deferred investment, though, you must pay taxes. To have Quicken help you with these taxes, it's probably best to enter the amount into a Quicken account as income, which will mark it as taxable. ■

by Kyle Schurman

Print Shop Premier

Working With Labels

PREMIER FOR WIN95

DESKTOP PUBLISHING

ut an attractive spin on envelopes, cassettes, diskettes, file folders, CD jewel cases, and name badges. *Print Shop Premier* offers several ready-made templates for the design of high-impact, picture-enriched labels. Label size selections are based on popular sizes of Avery products. You receive perfect output nearly every time.

Launch Print Shop, then click Labels in the Select A Project Project Picker menu. Three label design options appear. Choose Start From Scratch to design your own label. Select Help Me Design for guided assistance, including artwork, backdrop, and layout suggestions presented in a gallery, so you can compare design options. Customize A QuickStart Layout, Print Shop's final design method, lets you personalize the content of a ready-made template chosen by theme.

Once you choose a method such as Help Me Design, click the Next button to reach the Labels: Select A Format window where you can choose an Avery label product. You'll pick the product corresponding to the kind of project (such as address, disk, or rotary card) and type of paper (discrete sheet or pinfed, for example) that you'll use for printing. Several label size options are available for a variety of projects. If you click an Avery product in the Select A Format window, Print Shop previews the label sheet on the right side of the screen. Unfortunately, there is no option for user-specified custom size labels. If you do not see your Avery product on the list, you're out of luck.

Click a format (such as Avery Laser Label #5385 – Rotary Card) to highlight it, then select it by clicking Next. After you insert the Print Shop Product CD and click OK, the program retrieves the requested information, presenting six layout choices with mixes of text and graphics placeholders. To work without a ready-made layout, click the box beside No Layout at the bottom of the Select A Layout dialog box. Click OK after choosing a layout. Your selection opens in a single panel on the Design Desk, ready for editing.

Your Look. It's easy to personalize a Help Me Design template. For example, to choose a different picture, double-click the graphic you want to replace. The Select A Graphic dialog box lets you choose another image of the same type. To search along a theme, scroll the list of image categories available on the Categories tab, click a category to select it, then preview what is available with the list of options that appear on the right side of the screen. You can use keywords to search for a particular graphic by clicking the Keywords tab in the Select A Graphic dialog box.

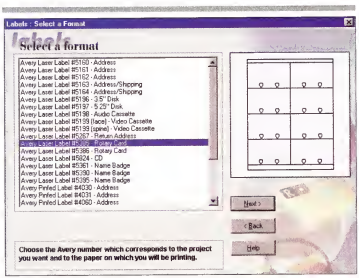
To modify an image without replacing it, select it by right-clicking rather than double-clicking. A menu appears with options such as Cut, Copy, Paste, Duplicate, Duplicate, Color, Frame, and Flip. Choose Duplicate, drag the copy to the other side of the card, right-click the second image, then select Flip and Horizontal from the pop-up context menu. This creates a mirror-image duplicate of the first graphic. Drag the second graphic to adjust its placement on the card.

The Right Words. You're now ready to modify placeholder text. Double-click anywhere on the text to begin editing. When the label is complete, select Print from the File menu. The Print Label Project dialog box presents a preview of the full label sheet. Every label contains identical text and graphics. Enter a number in the Number Of Copies field (Page Setup section) to print the desired number of label sheets. Click Select All to print an entire sheet. To print one label, click the desired label in the preview window to select it, then click Print. To select and print several labels on the sheet, press the CTRL key as you click each label.

Before printing to label stock, print one or two labels on an ordinary sheet of paper. Then take the printed "proof" and place it under a sheet of blank labels. Line up the edges of both sheets, then hold the two sheets up to the light or a window. If output appears too high or too low, or text and graphics seem off-center, modify the label.

For example, drag the offending graphic to a new location. Click the text box to make its handles appear, then drag on a handle to enlarge or shrink the text box. Double-click the text placeholder to edit the text. You can choose a different alignment or select a new Line Spacing by clicking appropriate buttons on the Text toolbar. Save your changes, then run another print test. When output on regular paper centers correctly, insert a sheet of blank labels, then click the Print button. ■

by Carol S. Holzberg, Ph.D.



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Microsoft Works 4.0

Sending Faxes

Faxing a *Microsoft Works 4.0* document may be easier than you ever imagined. In essence, you need only choose the fax/modem instead of a printer, then enter some obvious details such as the recipient's fax number. The best part is—because the process is integrated into Windows 95 (Win95)—once you fax a Works document, you also can fax other kinds of documents.

When you fax a document from your screen, you send an exact copy. Unlike in an E-mail message, the graphics, formatting, and fonts in your document appear on the recipient's copy. To do this, you need a fax/modem, *Microsoft Exchange* (which comes installed on many systems), and Microsoft Fax (included with Win95). To see if Microsoft Fax is installed, click the Start menu, choose Settings, and then Printers. If you see the Microsoft Fax icon, it's installed. Skip ahead to "Your First Fax."

To install Microsoft Fax, choose Settings under the Start menu, then open the Control Panel. Double-click Add/Remove Programs, then go to the Windows Setup tab. Check Microsoft Fax, then click OK and follow any on-screen instructions. (You may need the Win95 CD-ROM or diskettes.)

Your First Fax. Open the word processing, spreadsheet, or database document you want to send. (*NOTE: If the document's print size is unusually large, you will receive a message that the document and printer settings do not match.*) You can continue anyway, but any section of the document that extends beyond the paper size of the fax machine will not reproduce.

First, select Print from the File menu. Your regular printer appears under Printer Name. Click the arrow next to it, select Microsoft Fax, and click OK. (If this option does not appear you do not have Microsoft Fax set up yet.)

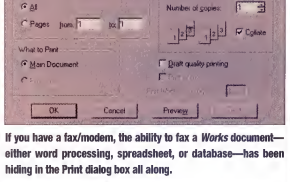
The first time you send a fax, the Compose New Fax dialog box appears. It assumes you are dialing from the default location. (You may check the box at the bottom to avoid this screen in the future.) You can click Dialing Properties to control items such as call waiting.

On the next screen, the computer needs recipient information. Type a name and fax number. The area code entered is the one for your default location; if you change it, an automatic selection of the Dial Area Code box takes place. Click Add To List and repeat the process to send the document to more than one person.

When you click Next, it's time to think about the cover page. If you do not want one, select No; otherwise, choose from Confidential, For Your Information, Generic, or Urgent. (To have more control over your fax, such as when it is sent, click the Options button.) If you choose a cover page, the computer automatically creates one using the recipient information, the computer's default information about where the fax is coming from, the date and time, and the number of pages sent. The Subject you enter on the next screen, then, becomes the Re: line, and the Note becomes just that—appearing either on the cover page or a separate one, as you specify. Unfortunately, you cannot preview any of this on-screen, which is why you may want to experiment before faxing anything too important.

Even if you have not selected a cover page, you will need to enter a Subject and Note. These appear as simple text, rather than a formatted page.

After you click Next again, you have one last chance to review your work by clicking the Back button; otherwise, click Finish. You will hear the modem dialing, and the Microsoft Fax Status window keeps you up-to-date on the connection and pages sent. When it's all over, you are back in your document, right where you started. If the fax does not go through, however, *Works will not tell you.* Instead, an error message appears in your Exchange Inbox.



If you have a fax/modem, the ability to fax a *Works* document—either word processing, spreadsheet, or database—has been hiding in the Print dialog box all along.

Finer Points Of Faxing. While you are becoming a Works fax pro, don't forget the Fax Cover Sheet TaskWizard, listed under the Correspondence category. Standard, international (with English, French, and German headings), and urgent forms are available. You can access the fax sheet you create through Microsoft Fax in the window where you pick a cover page (click the Options button, then opt to Browse).

The only disadvantage about computerized faxing is that signatures are not on the letters. If this is problematic, however, you can scan your signature and insert it as a graphic into the Works files you send.

Faxing documents through Works can save time, especially if you need to send one document to several people or want faxing done while you are away. To access Microsoft Fax without using Works, go into the Start menu, Programs, Accessories, then Fax. From there, you can both send and receive faxes. As you will see, sending a fax through Microsoft Works is a great way to ease yourself into the world of computerized faxing. ■

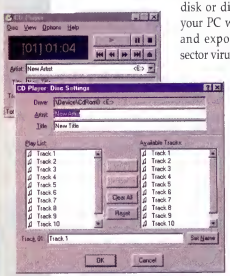
by Sarah D. Scalet

QUICK TIPS

Secrets To Succeeding In Common Tasks

Viruses

Your PC shutdown ritual should include removing any diskette from your diskette drive. Leaving a diskette inside the drive makes your PC vulnerable to **boot sector viruses**, which affect some of the first instructions the PC accesses at startup. Most computers are set to read the diskette drive first during their startup process. If a boot sector virus is lurking on a diskette sitting in your drive as you restart the PC, it can move from the diskette to your system. If you've ever started your PC with a diskette in the drive and received a "Non-System disk or disk error" message, it means your PC was reading the diskette drive and exposing itself to possible boot sector viruses.



The Windows CD player lets you describe your play list by adding the names of songs to each track on an audio CD.

Windows CD player

Diskettes

There aren't too many of them left around these days, but from time to time you might come across an old double-density (DD) diskette. These diskettes hold only 720 kilobytes of information. High-density (HD) diskettes, on the other hand, can hold twice as much information, or about 1.4 megabytes.

If you try to format an old DD diskette in Windows 95, you may run into trouble because Windows 95, by default, tries to format diskettes as HD diskettes. One way to format a diskette is by right-clicking the A: drive in Windows Explorer. Choose Format from the pop-up menu. You'll need to change the Capacity box by clicking the down arrow and selecting 720 kilobytes (KB).

E-mail

If friends, family, and coworkers constantly mock your inability to spell correctly in E-mail messages, just turn on the automatic spell check feature of your E-mail program. The feature will scan your message before sending so you don't have to remember to run the spell check on your own. To turn on the automatic spell check in Microsoft Exchange 4.0 open the Tools menu and choose Options. This brings up the Options Window where you'll select the Spelling tab. Check the box beside Always Check Spelling Before Sending and click the OK button. The next time you compose a message and press the Send button, the spell check will automatically run, and you'll save yourself some embarrassment.

Audio CDs

If you use Windows 95's CD Player, but often wonder what song title goes with what track while you're listening, there's an easy way to plug in those titles. Once you insert a music CD and start the CD Player program open the Disc menu and select the Edit Play List item. This brings up the Disc Settings Windows, where you can type in the artist's name, the album title, and all the song titles. Once you type in the information, the CD Player will display it every time you insert the same disc.

Headphones

Before you place a set of headphones connected to a PC on your head, check the volume first. You never know when somebody else might have used your equipment to listen to an audio CD, online radio station, or game. The headphone volume could be cranked up much louder than you expect.

PC Hardware

When your PC's fan is about to conk out, you'll hear a squealing or whirring sound coming from the back of your PC. It may get worse the longer your PC is on, or it may disappear entirely after a few minutes. Fans get clogged with dirt and do not go quietly on their way out! The good news is they are cheap and easy to replace. You first can try removing and cleaning the fan to see if that helps. If you hear no sound from your fan, make sure that it's still working. Your PC's internal components need that circulating air to maintain a healthy temperature.

PC Hardware

No matter what type of hardware you're installing, there's always one step you should take first. Shut off your computer and any attached devices. This includes scanners, printers, or anything else that's connected to your system and has an on/off button. Shutting off the PC prevents unexpected shocks when you're installing new hardware and reduces the chance of damaging sensitive computer components.

PowerPoint

The rotation tool in *Microsoft PowerPoint 97* normally lets you rotate pictures or objects around their center. If you want to rotate the picture or object around one of its corners instead, select the object, select the rotation tool, and hold down the CTRL key while you rotate the object. The object will rotate around the corner opposite the one you select.

Microsoft Word

The U.S. Postal Service now uses bar codes to speed up the delivery of mail. *Microsoft Word 6.0* and newer let you take advantage of the technology by creating addresses with bar codes. The POSTNET bar codes Word adds are machine-readable representations of the ZIP code and delivery address. Open the Tools menu, select Envelopes And Labels, and then go to Options. Just select the box that reads Delivery Point Bar Code. Click OK, and you'll see the address with the new bar code just above it in the Preview window. You can print your newly bar-coded envelope straight from the Envelopes And Labels window by clicking the Print button.

Windows

There's a quicker way to shut down programs than using several menu options. You can close an active window or program simply by pressing ALT-F4. If there are no windows or programs open on your Desktop, pressing ALT-F4 will open the Shut Down Windows dialog box. This key combination works in all versions of Windows.

Windows

The fastest way to move among open windows or programs is with your keyboard. You can switch among them by pressing ALT-TAB. When you use this key combination, a box pops up showing the icons for all the open windows. A square will appear around the active window, and a description of it will appear at the bottom of the box. Hold down the ALT key and keep pressing the TAB key until the square appears around the window or program you want to make active. When you release the keys, that window or program will become the active window.

Copying Files

A recent issue explained how to make a quick backup copy of a diskette. One of our readers, Bill Frisch, wrote in to point out an even easier way to do this in Windows 95 (Win95). Make a shortcut of your diskette icon on your Desktop (right-click the diskette drive icon in My Computer window, drag it to the Desktop, release it, and select Create Shortcut Here from the pop-up menu). Now any time the drive contains a diskette you want to duplicate, right-click the shortcut icon, select Copy Disk from the pop-up menu, and follow the instructions Win95 provides.

E-mail

If your E-mail program supports it, consider using the blind carbon copy (BCC) option when you want to send someone a copy of a message, but don't want or need the normal recipients to know the blind recipient was included. Simply type the recipient's address into the BCC line in the upper E-mail header.

WordPerfect

WordPerfect 6 and 7 let users with a creative bent change the default bullets and numbers of a bullet list to smiley faces or hearts. Open the Insert menu and select Bullets & Numbers. Select the characters you want to change in the Styles list and click Edit.

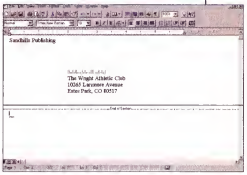
In the Styles Editor dialog box, press the DELETE key to remove the default character settings. Press CTRL-W to open the WordPerfect Characters dialog box and choose the character(s) you want to use as the new default bullet. Now click the Insert And Close button.

Now go to the Styles Editor dialog box and click the new character in the Contents box. This changes the character to a WordPerfect default character. Click OK.

Viruses

Here's one way to protect your software's original diskettes and keep your PC virus-free. Copy the original diskette's entire contents to another diskette, then keep the original diskette in a safe place. Use the copy for software installations and maintenance. If something goes wrong while you're using the diskette, you'll have the original in reserve.

Write-protect the new diskette so no viruses will be written to it during software installations and you won't infect a PC the next time you install the software. To write-protect a 3.5-inch diskette, slide the tab in the upper-right corner so the window is open.

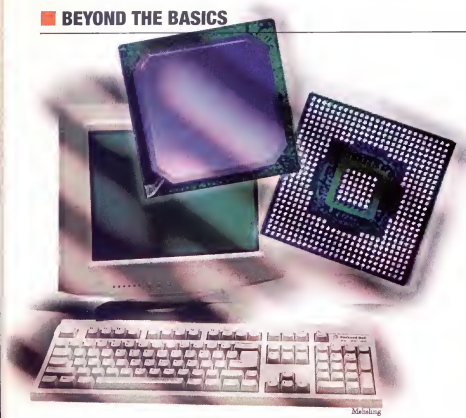


Make the post office's job easy by adding a bar code to envelopes printed with *Microsoft Word*.

Microsoft Word

Desktop Publishing

To ensure successful print jobs, especially when sending documents to a high-end imagesetter for professional printing, stick to basic fonts. Avoid using specific bold or italic fonts such as Bodoni Bold, Helvetica Black, or Garamond Light. Imagesetters (and even some office printers) often can't handle these specialized fonts. If you want to emphasize words in a document, use a basic font such as Times New Roman and italicize or bold it with your word processor's formatting tools. ■



Melnikoff

The Quiet Role Of Chipsets

This Overshadowed Component Brings New Technologies To Desktop & Mobile PCs

Basketball player Scottie Pippen could probably relate to the role that a chipset plays in a computer. Like the Bulls' star who has been a crucial part of every NBA championship team in Chicago, the chipset is vital to the function and performance of a PC. Also like Pippen, the chipset labors in the shadow of a far more popular, cream-of-the-crop component: the processor.

It is not that the chipset toils in complete anonymity. Certainly, computer engineers and industry insiders understand the importance of the chipset, also referred to as the "core logic" of a PC. But average computer users probably know little about it. And why should they? The processor stands in the spotlight, the subject of numerous commercials and the focus of consumers' interest.

It's time to give this unheralded component a moment in the spotlight. Just as no one player can win a team championship, neither can only one part of your PC determine all the capabilities of your system. In fact, you may be surprised to learn just how much a chipset affects your computer's performance.

What Are They? You're probably familiar with the analogy that a computer's **central processing unit** (**CPU**) acts as the brain of the system. It provides your PC with the juice to run your software. Continuing with the human anatomy comparison, then, a **chipset** is like the nervous system, taking orders from the CPU and moving traffic through the PC. Your graphics, memory, and **peripheral component interconnect** (**PCI**) **bus**, which allows for speedy communication between the CPU and hardware such as your printer and keyboard, are affected by the chipset.

The chipset is soldered on to the **motherboard**, the circuit board that contains such components as the CPU, random-access memory (RAM) chips, and expansion slots. This type of attachment prevents you from upgrading to a better chipset. To change your chipsets you have to replace your motherboard.

A chipset is composed of a "north bridge" and a "south bridge," each approximately the size of a quarter, though square and made of silicon. The north bridge acts as the traffic director for the CPU and memory. It is the high-speed component of the chipset, the gateway to memory, says Ron Huff, product marketing manager for Advanced Micro Devices (AMD). If it fails, it would be like the CPU failing. The south bridge, on the other hand, services the PCI bus and the peripherals it connects—the "generic input/output features," Huff says.

Daniel Francisco, a spokesperson for Intel, which manufactures chipsets, likens the inner workings of a PC to a compass. "Envision the CPU as the north setting on the compass dial, with graphics, memory, and the PCI bus being the other settings," he says. "In the middle of all this is the chipset, giving direction to the other components."

A chipset also affects your system's **bandwidth**, which is your PC's capacity for transmitting data. The greater the bandwidth, the speedier your computer. Richard Malinowski, director of engineering for Intel's Platform Components Division, says a chipset provides "bandwidth management," making sure each component receives its proper share of power from the CPU.

New Technologies. While the CPU is largely responsible for the power and performance of your PC, it cannot introduce a new technology to your system. That's what a chipset does. Technologies such as the **Accelerated Graphics Port** (**AGP**) and **Universal Serial Bus** (**USB**) have been brought on board by chipsets.

AGP and USB are such new technologies that they are just now included in desktop and portable PCs. To understand these technologies is to understand the importance of a chipset. The AGP interface is a new platform bus specification that enables high-performance graphics capabilities, such as three-dimensional (3-D) graphics and video. The port provides a high-speed connection between your computer's graphics controller and the system memory.

USB is a **plug-and-play** peripheral connection. (Plug and play is the ability of a computer

to detect and configure new hardware automatically.) It allows for instant, easy connections for such things as digital joysticks, speakers, scanners, and PC telephones, according to the USB Developers' home page at http://www.usb.org.

For example, let's say you're in the middle of playing a game, and a friend wants to join you. The USB's **hot-swapping** capability lets you plug in another joystick without disrupting the game. Because information flows both ways on a USB connection, it also enables **force-feedback technology**, which let you "feel" the mass of a virtual object. For business-related purposes, a USB connection lets you use, for example, new sophisticated PC telephone software, which can turn your computer into a "call management center."

Evolution. Given that a processor and chipset are so integrally linked to one another, it is fair to wonder about their creation order. Are chipsets designed to complement a processor, or is the CPU made for the core logic?

Like many other computer technologies, the evolution of the chipset has increased dramatically in the last few years. It used to be that Intel would design a processor first and then the corresponding chipset. Now they are designed simultaneously, although the chipset has a longer design cycle, says Randy Wilhelm, director of Manufacturing and System Engineering for Intel's Platform Components Division.

"The technologies are migrating very rapidly, as more and more the processors and chipsets are designed with end users' expectations in mind," Wilhelm says. Thus, the one-size-fits-all chipset is becoming mostly outdated. Chipsets are being designed to work with a specific processor. By making chipsets and CPUs in sync, Intel believes it offers a "balanced platform" for the PC, Wilhelm says.

The Newest Sets. Though it is not within the scope of this article to make a critical comparison of the various chipsets on the market, we want to inform you of some of the newer chipsets to give you an idea of the latest technology they are enabling for desktop PCs. If you're interested strictly in how this information affects your PC buying decisions, skip to "The Bottom Line" below.

Intel groups its chipsets in families, or classes, according to the processor they are designed for and the capabilities they deliver. The 430 class (the 430TX, 430VX, 430HX, etc.) works with the Pentium processor. In August 1998, Intel began marketing its 440 class, which introduced accelerated graphics capabilities. The following are three members of that family of chips:

- The 440BX chipset increases the system bus bandwidth from 66 megahertz (MHz) to 100MHz. It supports Pentium II processors that run at 350MHz or 400MHz. A 440BX set is also available for mobile PCs.
- The 440LX AGPset, as the name indicates, introduced AGP capabilities to the Intel platform. It also introduced Intel's Quad Port Acceleration optimization for the Pentium II processor.
- The 440EX AGPset is designed for the Intel Celeron processor, which is Intel's newest CPU for lower-cost PCs ($1,200 and below). It supports 66MHz Synchronous Dynamic RAM (SDRAM) and allows for a USB connection.

Not surprisingly, Intel, the leading manufacturer of processors, also has the lion's share of the chipset market. But you may be surprised to learn that Intel is a newer player in this market.

Nathan Brookwood, a microprocessor analyst with Dataquest, says that in 1992 several dozen companies manufactured chipsets, but not Intel. Then the following year Intel began making them out of a perceived necessity. "Intel didn't believe that chipset manufacturers were keeping up with the technology it was employing for its processors," Brookwood says. "Intel thought the performance of its CPUs wouldn't be good for anything without a chipset that could support them."

Now the dominant chipset manufacturer (see chart), Intel has changed the "whole model of the industry," Brookwood says. Before, manufacturers of high-priced chipsets offered high performance with their product, and manufacturers of low-priced chipsets offered affordability. But companies employing inconsistent technical processes in their manufacturing fell by the wayside in the chipset market, he notes. Now, Intel has combined the best of both worlds. It makes a high volume of high-quality chipsets at a low cost. In fact, according to Intel's Francisco, when sold to original equipment manufacturers (OEMs) in quantities of 10,000, chipsets are only about $50 each. Compare that with the cost of a CPU, which Brookwood says sells to OEMs for $200 on average.

Chipset Market Share

A comparison of market share units and revenues between 1995 and 1996 for the top five manufacturers of chipsets. (Statistics supplied by Dataquest. Figures for 1997 were unavailable at press time.)

Revenue

Company	1995	1996	Change
ALi	$56.8 million	$78.1 million	+38%
Intel	$445 million	$972 million	+118%
OPTI	$125 million	$84 million	-33%
SiS	$180 million	$130 million	-28%
VIA	$140 million	$64 million	-54%
Total Market	$1.38 billion	$1.46 billion	

Units
(Figures In Millions)

Company	1995	1996
ALi	4.7	5.6
Intel	16.5	40.2
OPTI	7.9	4.2
SiS	10.7	8.4
VIA	9.3	3.9
Total Market	76	71.4*

*Drop in units due to vendors of mobile computer units using their own chipsets.

The competition between chipset manufacturers will make for an interesting "sideshow in core technology this year."
—Nathan Brookwood, Dataquest

You can guess how Intel's entrance into the chipset market affected other manufacturers. Many simply dropped out altogether, and some drastically cut back production. "Companies like OPTi were thrown for a loop," Brookwood says. "They stopped making chipsets except for their mobile units." But some chipset manufacturers have picked up some of the market share left by the departure of other companies. Three Taiwan-based companies, Acer Labs (ALi), Silicon Integrated Systems (SiS), and VIA Technologies, produce chipsets that offer core logic for AGP capabilities to run on Pentium-level processors.

Intel, however, believes AGP is best run on Pentium II-level CPUs. "AGP is optimized with a Pentium II processor," Francisco says. "The **Socket-7** platform doesn't deliver the bandwidth needed to run AGP as well, so the PCI bus gets bottlenecked because the graphics put a ton of stress on your system." (Socket 7 is the industry standard for CPUs older than the Pentium II. Most Pentium chips besides the P2 conform to the Socket-7 specifications.) Intel's 440LX and BX chipsets give the AGP its own port on the set, plus the Pentium II has a Dual Independent Bus architecture¾both of which help ease the graphics congestion, Francisco says.

OPTi produces a line of low-cost chipsets, including the FireLink and FireStar Plus, for computers powered by Pentium processors. The FireLink enables a USB connection, whether through a motherboard, PCI slot, or CardBus. It works for Windows 98, Windows 95, Windows NT, and Windows CE.

VIA's line of chipsets includes the Apollo class, which offers core logic for the Socket-7 platform and the platform for the Pentium II, which is sometimes referred to as the Slot-1 platform. (The name comes from the motherboard location where the cartridge for the processor resides.) The Apollo MVP3 set, for the Socket-7 platform, enables accelerated graphics using a PCI bus, with bus speeds ranging from 66MHz to 100MHz. The Apollo P6 is designed for the Slot-1 platform.

The SiS5601 chipset from Silicon Integrated Systems is designed for Pentium II-style processors and enables accelerated graphics and a USB connection. For Pentium desktop PCs, there is the SiS5591, which supports memory bus speeds of up to 83.3MHz and a Level two (L2) cache controller. It also allows accelerated graphics. In addition, SiS manufactures a line of chipsets for Pentium-class mobile PCs.

ALi's core logic products include the Aladdin V chipset for Pentium-class processors, and the Aladdin Pro II chipset for Pentium II-class processors. Both chipsets support bus speeds of 100MHz, processor speeds of up to 300MHz, and accelerated graphics.

Last year AMD introduced the AMD-640 chipset to support its AMD-K5 and AMD-K6 processors. Huff compares the AMD-640 to Intel's 430TX chipset, noting that while the 430TX allows a maximum of 64 megabytes (MB) of memory expansion, the AMD-640 allows 512MB of memory expansion and a larger L2 cache. (You can find the AMD-K6 processor and AMD-640 chipset in some Compaq computers.)

AMD's focus, however, is not making its own chipsets, but working on the **Super7** initiative with other manufacturers of Socket-7 components. Super7 is a new infrastructure that will enhance the Socket-7 platform with such things as a 100MHz local bus protocol, accelerated graphics, and support for a frontside L3 cache. To that end, AMD now enjoys what Huff calls a "virtual integration" relationship with chipset manufacturers ALi, SiS, and VIA, plus CPU makers such as Cyrix and Integrated Device Technology Inc. (IDT), sharing technology to enable the platforms for its processors.

The competition between chipset manufacturers will make for an interesting "sideshow in core technology this year," according to Brookwood. He sees Intel driving the market one way, and companies such as AMD and Cyrix driving it another. "When Intel introduced AGP, it was used as a strong incentive to move people to using a Pentium II processor," he says. Obviously, other chipset manufacturers do not see the inextricable link between AGP and the Pentium II that Intel does. If consumers agree, then companies such as AMD and Cyrix may very well gain in market share.

The Bottom Line. So how does your newfound knowledge of chipsets and their manufacturers affect the way you may shop for a PC? To your wish list of a powerful processor, an eight gigabyte (GB) hard drive, 64MB of RAM, a 32-speed (32X) CD-ROM drive, and 56 kilobits per second (Kbps) modem, should you add a specific type of chipset?

Well, in a sense you already have. You cannot ask an OEM such as Packard Bell or Gateway to build you a computer with the chipset of your choice. But by asking for a PC with certain capabilities, you will automatically receive a chipset that can deliver those functions.

Determine what you want your PC to accomplish. Intel's Francisco suggests you first decide what kind of power (speed) and performance you are looking for in a PC. In other words, get the processor you want. Next, if excellent graphics capabilities, for example, is a requirement and the OEM claims its PC can deliver that, then the chipset you need is included.

Dataquest's Brookwood also advises consumers not to focus on what chipset a PC has, but on what functions the PC is capable of. If the processor and the peripherals can perform the functions you desire, then you will have the right chipset—and the computer of your dreams.

Or, to look at it another way, imagine participating in a fantasy basketball league in which drafting Michael Jordan meant you automatically received Scottie Pippen as well. Now that is a dream combination. ■

by Rachel Derowitsch

For More Information:

Acer Laboratories Inc. (ALi)
(800) 733-2237, (408) 432-6200
http://www.acer.com/aac

Intel Corp.
(800) 548-4725, (408) 765-8080
http://www.intel.com

OPTi
(408) 486-8000
http://www.opti.com

Silicon Integrated Systems (SiS)
(408) 730-5600
http://www.sis.com.tw

VIA Technologies
(510) 683-3300
http://www.via.com.tw

Moving To Windows 98

"Evolution not revolution." Microsoft spin doctors are spending millions to send this message out in efforts to position the new Windows 98 operating system. The upgrade is a minor one visually for Windows 95 users. The biggest change they'll notice after the jump to Windows 98 is that the on-screen Desktop looks suspiciously like surfing the World Wide Web using the *Microsoft Internet Explorer 4.0* Web browser. Plenty of new and beefed-up features are available, but the majority of the 3,000 changes in Windows 98 (Win98)—many of which Microsoft doled out in free service releases and patches through the years—are under the hood.

Revolution, however, is exactly the word to describe what is in store for users jumping on the Win98 bandwagon from Windows 3.x. Microsoft estimates more than 40 million people use Windows 3.x. If you're one of them, be prepared; Win98 is a compelling upgrade. The new operating system boasts significant new features, runs faster, works smarter, crashes less often, and delivers a smoother installation and upgrade process.

That's not to say you can simply slide the Win98 installation CD-ROM into your CD-ROM drive and relax. Your application software should make the leap to Win98, but it may take awhile to locate everything as the program icons and other details might be in unusual places. With so many evolutionary and revolutionary jumps in hardware technology during the past three years, many Windows 3.x users might not even have a CD-ROM drive. Some will be forced to buy a new PC. Others, regardless of operating system, will need more random-access memory (RAM) or a bigger hard drive before making the switch. What you'll need depends on your current hardware and what software you plan to use.

Step 1: Check Your System. Before you pay around $100 for the new operating system, computer experts such as William Goldstein, a Los Angeles-based consultant, recommend a hard look at your trusty PC—especially if it's several years old.

Goldstein advises making sure your hardware can handle Win98 system requirements. While Microsoft says the new operating system will work on older systems with 386 or 486 central processing units (CPUs), at least 16 megabytes (MB) of random-access memory (RAM), and a one-gigabyte (GB) hard drive running Windows 3.x or MS-DOS, you won't be happy with the results on such a setup. You simply can't raise a 486—let alone a 386—to the standard needed to run Win98 properly. You could replace the **motherboard** (the main circuit board inside your PC), but you're better off buying a new system. The same philosophy applies if you have a PC using an early model Pentium CPU, say anything under 90 megahertz (MHz). If you currently have a 90MHz or higher Pentium, you can improve performance by upgrading your CPU and adding more memory for about $400. For best results, Goldstein recommends something close to a system with a 233MHz Pentium chip with MMX technology, at least 32MB of RAM, a 2GB hard drive, an eight-speed (8X) CD-ROM drive, and a 56 kilobits per second (Kbps) modem.

Industry experts expect Win98 to be on most new PCs by the end of 1998. (It should be in stores by the time you read this.) If you bought a PC before Win98's release or if the PC you buy doesn't have Win98 installed, ask your retailer about a free upgrade. Upgrade programs and prices will vary from retailer to retailer.

The hardware truth. For current Win95 users, the two most common areas that might need upgrades are RAM and the hard drive, says Shawn Sanford, Microsoft's product

Project Overview

Tools
Windows 98
CD-ROM, diskettes

Time
About 60 minutes

Cost
About $100

Benefits
Improved support for newer hardware, Web-like interface, automatic software updates

Leading Companies
Microsoft

manager desktop. Win98 requires a minimum of 16MB of RAM to run, compared to 8MB for Win95 and 4MB for Windows 3.x. The key word here is "minimum." You'll receive significant improvements in performance with 32MB. Goldstein advises clients to opt for 64MB. Expect to pay about $150 for 64MB of RAM (compared to $30 per megabyte a year ago) at stores such as CompUSA (800/266-7872) or mail-order catalogs such as Micro Warehouse (800/367-7080).

Three years ago, Win95 drew criticism for needing around 45MB of hard drive space. Win98 raises the bar by needing an additional 150MB of hard drive real estate. (Windows 3.x users will get some hard drive space back using Win98's Drive Converter to convert their FAT16 file system to FAT32. See below.) Whether you're switching from Windows 3.x or Win95, anything less than a 1GB hard drive won't handle the migration. If your old hard drive is full, get a new one from companies such as Seagate (800/327-2232, 405/936-1210, http://www.seagate.com), which sell a 4.3GB drive for about $184 and a 6GB drive for around $225. A cheaper alternative is to buy something like Iomega's Zip 100 drive ($150, 800/691-8833, 801/778-1000, http://www.iomega.com). Then you can copy files to a Zip disk, which holds the equivalent of more than 70 diskettes.

Unlike puny 16-bit Windows 3.x software, 32-bit Win95 (and Win98) software gobbles up hard drive space. Win98 will run most of your old software, but if you plan on upgrading to newer 32-bit software, you'll need plenty of free space on your hard drive. A typical installation of *Microsoft Word 97*, for example, requires 46MB. Multimedia games and graphics programs need even more. As a very general rule of thumb, allot at least 20MB per Win98 application. Revolutions cost money. And upgrading all your software from Windows 3.x to Win98 is no exception. Be sure to factor in these costs.

Step 2: Preparing For Installation.

Once you have the hardware to handle Win98's software requirements, the tendency is to skip system maintenance steps and move right into Win98's installation. Don't do it, caution both Sanford and Goldstein. Taking the time to prepare your computer reduces the potential for any installation problems. Here's what to do.

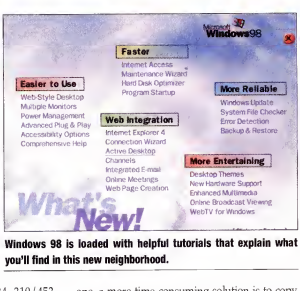
Scan your hard drive. A corrupted **File Allocation Table** (**FAT**, which tracks data on a disk) or cross-linked files can quickly derail the Win98 upgrade. The easiest way to prevent this is to scan your hard drive with ScanDisk, a handy utility that finds and repairs problems with files and directories. ScanDisk is included in Win95 and Win98. In Windows 3.x, it appears as a DOS utility. Another alternative is to run Disk Doctor, one of Symantec's *Norton Utilities* ($79, 800/441-7234, 310/453-4600, http://www.symantec.com).

Check for viruses. Windows 3.x shipped with antivirus software, though it is inexplicably missing from both Win95 and 98. If you don't have antivirus software, a quick way to obtain it—provided you have a connection to the Internet—is to download a free trial copy of products such as Symantec's *Norton AntiVirus* ($49.95 for the full version). If you do have an antivirus program, make sure you have its latest update. With new viruses constantly arriving, antivirus software is only as good as its last update.

Preparing your computer reduces the potential for any installation problems.

Back up your PC. Back up your entire hard drive before upgrading to Win98. Your upgrade probably won't have any problems, but there's always the possibility that something could go wrong, damaging or destroying your data.

Both Windows 3.x and Win95 include backup utilities (an even better one ships with Win98). At the very least, copy critical system files such as Autoexec.bat, Config.sys, Win.ini, System.ini, User.dat, and System.dat onto a diskette. Windows 3.x users should include files in the WINDOWS directory such as initialization (.INI), registry data (.DAT), and Program Manager group (.GRP) files. Ditto for important data such as your financial, personal, and business documents. If you have a tape backup system, use it and then test it before the upgrade. You also can copy files to another storage device such as a Zip drive. If you don't have one, a more time-consuming solution is to copy files to regular diskettes using compression utilities such as Nico Mak's *WinZip* ($29, 800/242-4775, 713/524-6394, http://www.winzip.com) or Mijenix's *ZipMagic* ($40, 303/245-8000, http://www.mijenix.com).



Windows 98 is loaded with helpful tutorials that explain what you'll find in this new neighborhood.

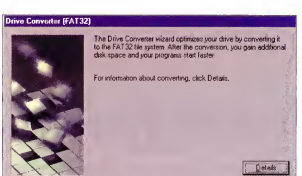
Turn off monitoring software. In both Win95 and Windows 3.x, close all programs that run in the background such as antivirus, crash protection, and monitoring software. These applications interfere with the Win98 installation process. For best results use Windows Explorer in Win95 or Program Manager in Windows 3.x to remove these programs from your StartUp folder so they won't automatically start with Windows. When you finish, close Windows, turn off your PC, then restart.

Special Software Warnings.

While Win98 will run 16-bit and 32-bit software designed for Win95, Windows 3.1, Windows NT, and MS-DOS, many utilities (including file management tools, backup software, crash protectors, and virus scanners) won't work properly after Win98 is installed. In fact, running them could be dangerous.

Windows 3.x users will feel the effects more than Win95 users because of the revolutionary jump in Windows technology. Older 16-bit applications simply can't read or recognize the long filenames used in Win98's (or Win95's) 32-bit operating system. When you upgrade, you'll have to use Win98's built-in utilities or buy the upgrade for your favorite application, if available. Software publishers are just releasing Win 98-ready software. Others never upgraded from Windows 3.x versions to Win95 versions.

Depending on what version of Win95 you have, many Win95 utilities may be incompatible with Win98's FAT32. This new feature that



The FAT32 file system is a critical factor in leaping to Windows 98. Fortunately, you can install Windows 98 without FAT32, then use this conversion utility to quickly convert your hard drive.

recognizes larger hard drives using a single partition lets you store more data and runs software faster and more efficiently. The problem is older "pre-FAT32" utilities misinterpret the new FAT32 settings and attempt to "repair" them, which can destroy data. To check your version of Win95, right-click My Computer, select Properties, and click the General Tab. Windows version 4.00.950b includes FAT32. If you have it, whatever utilities are working on your Win95 system will work on Win98.

Don't be too concerned with FAT32. Sanford says you don't need it to upgrade to Win98. Whether you're coming aboard from Windows 3.x or Win95, you can convert to FAT32 after you upgrade using Win98's FAT32 conversion utility. Simply click the Start button, then Programs, Accessories, System Tools, and select Drive Converter (FAT32).

With both Windows 3.x and Win95, if you're unsure whether your software utilities will work under Win98, call the publisher's technical support line first or check its Web site and ask before you run them.

Check hard drives for compression. Sanford cautions against installing Win98 on a **compressed** hard drive, which stores data in a special space-saving format. To check for compression in Win95, click Start, Programs, Accessories, System Tools, and select DriveSpace. Open the Drive menu and choose Properties. If the drive is compressed, click Uncompress to uncompress your hard drive. You might have to remove some files before DriveSpace can uncompress the drive. In Windows 3.x, the process is more complicated and time-consuming because many compression utilities such as the once-popular *Stacker* are no longer available or supported. Be sure to check your manual or call tech support. Depending on the size of your drive, you might have to copy important files to a diskette, reformat the hard drive, then install Win98. Unfortunately, there's no quick solution.

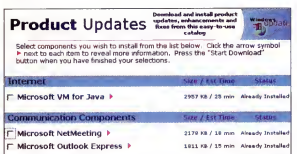
Give your PC a boot. Create and test a **bootable diskette**. The diskette will contain the critical files needed to start your computer in case of problems. In Win95, open Control Panel, select Add/Remove Programs, click the Startup Disk tab, insert a diskette in the drive, and click the Create Disk button. In Windows 3.x, open File Manager, click Disk, then select Make System Disk. In both cases, also copy the **device drivers** (software that controls hardware) for your CD-ROM drive. Check your drive's documentation for details on locating these drivers.

Get the latest drivers. Make sure you're using the latest drivers for things such as your printer, monitor, and modem. Win98 boasts a library of more than 1,000 **Plug-and-Play** drivers (designed to automatically configure hardware), but if you're using older legacy hardware (pre-Win95), you should have these files on diskettes just in case Win98 doesn't recognize them, Sanford says. If you have an Internet connection, check your hardware manufacturers' Web sites or call technical support. In most cases, the updated drivers are free.

Step 3: Start Installation.

Depending on your system, Win98's installation takes about an hour. Upgrading from Windows 3.x takes longer. Here's what you can expect:

1. Inserting the Win98 CD-ROM into your CD-ROM drive automatically launches the Setup Wizard, a handy tool that guides you through the rest of the installation process. If Win98 does not load automatically, click Start, then Run, and in the dialog box type **d:\win98\setup.exe**.
2. When Microsoft's License agreement appears, check the I Accept The Agreement button, then click Next to reach Win98's Setup Screen. Here, Win98 checks your system, collects information, copies Win98 files onto your hard drive, and performs various hardware checks, Sanford says. Throughout the installation, this screen lets you know exactly what Win98 is doing. Setup steps appear on the left side of the screen, and each is highlighted as its activity is performed. A graph displays the progress of the installation with "minutes left."
4. When the Product Key screen appears, type in the 25-character CD Key code (the exact name of this code may change in the final Win98 version). On pre-release versions of Win98, this number was on the CD-ROM package.
5. If you have the 50MB of hard drive space required, click Yes when Win98 suggests saving your old system files. That way, if you don't like Win98, you can "roll back" your system to either Win95 or Windows 3.x. If you do like the new operating system, you can delete this file later.
6. From the list provided, select your country or region, such as United States, then click the Next button.
7. When Win98 asks you to create a new Win98 startup diskette, Sanford advises clicking Yes. Win98's startup diskette automatically includes device drivers so you can access your CD-ROM drive from a DOS prompt. Do not overwrite your Win95 or Windows 3.x startup diskette. Use a fresh diskette.
8. From here, the installation process takes different routes depending on what you're upgrading from. Windows 3.x users must answer a few more questions because Win98 is actually rebuilding Windows 3.x components. Another major difference: Only Windows 3.x users will get a choice of installation options. These include: Typical, Portable, Compact, and Custom. For best results, Sanford suggests Windows 3.x users select Typical. This option is unavailable to Win95 users. To simplify the installation process, Win98 automatically installs the scenario most like the one you're using. Don't worry if you want more—or fewer—features. Once Win98 is installed, it's a breeze to Add or Remove features (see below).
9. Now Win98 looks for Plug-and-Play devices, recognizing hardware components and installing updated drivers. The process, including rebooting and initializing your PC, is completely automated. When it's finished, Win98 is ready to run.
10. No installation is perfect. If your system freezes or stalls, Sanford recommends pressing the CTRL-ALT-DEL key combination. When the Close Program window appears, highlight Setup and click the End Task button. If your system is completely frozen,



Some of Windows 98's convenient innovations are immediately obvious. Once it scans your system, the Update Wizard reveals what updates are available and offers a brief description of what each does.

turn off your PC. Depending on where you are in the process, your system will either reboot back to where it left off in the install process or back into your original operating system. Try reinstalling Win98. If you encounter the same or a different problem, stop and call Microsoft technical support at (800) 936-5700.

Step 4: Welcome To Windows 98.

As soon as Win98 boots up for the first time, you'll be greeted by a "Welcome To Windows 98" screen. Options let you register Win98, Connect To The Internet, Discover More About Windows 98, and Maintain Your Computer. Click the Begin button, and Win98 wizards guide you through each step. You can select options individually or simply close the Welcome Window and go back to work.

Using Win98 will be easier for Win95 users already familiar with the Desktop and operating system. Windows 3.x users might need more time to get used to Win98. To help, Win98 includes excellent step-by-step tutorials. You can find more help by clicking the Start button, then Help. It's a good idea to test all your applications and make sure they work. If they don't, chances are the software isn't getting along with your hardware and you need to reinstall the device drivers. In rare cases, you'll have to upgrade the software.

If you have an Internet connection, it's a good idea to register Win98. Just click the Register Now button. After you fill out a few screens of information, you'll have access to online technical support and, more importantly, be able to take advantage of a nifty new Win98 feature that can automatically update itself. While connected to the Internet, click Start, Settings, then Windows Update. This launches Internet Explorer and automatically sends you to Microsoft's Windows Update Web site. Permission is asked to scan your system. Once completed, Windows Update checks the site for new drivers and operating system updates. You're presented with a list of files, a description, and approximate download times. You'll also see what's already installed on your system and whether updates are available. Simply click what you need, and the files are downloaded and, in most cases, installed automatically.

When you finish, don't forget to click Device Drivers and System Files. This is especially important if you upgraded from Windows 3.x. The Update wizard scans your computer to see what files can be updated.

After your PC is armed with the latest patches and drivers, log off the Web and select Maintain Your Computer. This launches a new Maintenance Wizard that runs ScanDisk, Defrag, and Disk Cleanup. These handy utilities optimize your system and keep it in top shape.

Finally, to see a complete list of which Win98 features were installed and what's still available, insert your Win98 CD into the CD-ROM drive, open Control Panel, click the Add/Remove Programs applet, then Windows Setup. By checking or unchecking boxes, you can install or uninstall Win 98 components.

For More Help. If you have a connection to the Internet, your best bet for assistance is Microsoft's official Win98 Web site (http://www.microsoft.com/windows/windows98). You also can open Internet Explorer, click Help, then select Online Support (http://support.microsoft.com/support/a.asp?PR=W98&CU=0&DU=1&M=S.) Even Yahoo! has a Windows 98 Page (http://www.yahoo.com/Computers_and_Internet/Operating_Systems/Microsoft_Windows/Windows_98).

Finally, if you want to talk to someone, technical support is free for the first 90 days. Afterwards, Microsoft charges $35 per incident. Call Microsoft at (800) 936-5700 or call (900) 555-2000 and have your credit card handy. ■

by Michael Cahlin

3.x Factors

Windows 3.x users need some special advice when upgrading to Windows 98 (Win98). It's impossible for Win98 to foresee every possible software configuration and conflict. Obviously, older hardware and software will be harder for Win98 to configure. In addition, many software system enhancements designed to improve Windows 3.1 performance actually can crash a Win95 or Win98 installation. By following the extra steps below you can better prepare your computer for the safest, cleanest, easiest Win98 installation.

Forget memory managers. Using the DOS editor (at a DOS prompt type **edit** and the name of the file you're editing) or your favorite text editor such as Notepad, edit your Config.sys file. (Remember to back up all system files on diskettes before changing them.) If you're using a memory manager such as Quarterdeck's *QEMM* to organize random-access memory (RAM) efficiently, delete lines with Dosdata.sys, Dos-up.sys, and Loadhi.sys from Config.sys. Delete any other memory manager such as SMARTDRV, 386 Max, Netroom, plus any memory-resident programs (TSRs). Open Autoexec.bat and search for other utilities and device drivers such as DOSKEY. Follow this rule of thumb: When in doubt remark it out. To remark a line type **rem** at the beginning of the line. This tells the PC not to run the line.

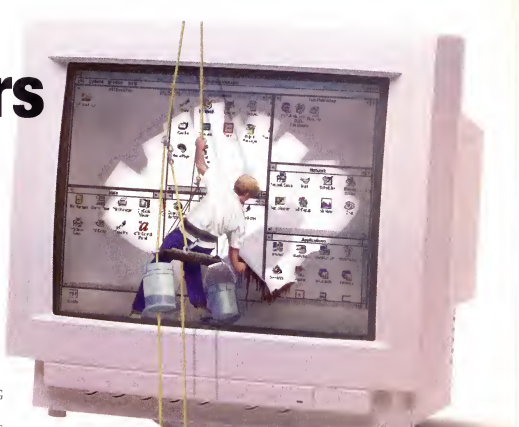
System turn offs. Using Windows 3.1's System Configuration Editor (open Program Manager's File menu, choose Run, and type **sysedit**), open Win.ini and look for the lines with "load=" or "run=." Preface each line with a semicolon to turn it off. Open Config.sys and remove lines with "stacks=," "buffers=," and "files=."

Don't load Windows. If Windows 3.1 loads automatically when your computer boots up, open the Autoexec.bat file and delete the "win" command.

Run MemMaker. Go to a DOS prompt and type **ver** to see what version of MS-DOS you're using. If you're using DOS 6.x or newer, run MemMaker. Go back into Windows 3.x, click File, Run, then type **memmaker**. Accept all MemMaker's default values. When asked to delete QEMM command, answer Yes. □

Monitors

Tips That Ensure You Get The Picture



Everyone loves **What You See Is What You Get** (**WYSIWYG**) computing. You can create a document with the confidence that it will look the same way when it's printed as it does on your monitor. When your monitor is malfunctioning, however, your computing becomes the frustrating What You See Is **Not** What You Get. No one loves WYSINWYG computing.

The computer monitor receives its signals from the video card inside the computer. Often, when the monitor is working improperly, the problem has its roots with the video card. But some display-related problems originate with the monitor, and many of them can be corrected fairly easily.

As you attempt to troubleshoot your monitor problem with the following suggestions, we have to remind you of one absolute rule regarding monitors: *Never attempt to open the monitor case yourself.* You'll ruin the monitor and you could receive an electrical shock, even if the monitor is unplugged. (See sidebar.)

Problem: The monitor does not have a picture.

Solution: Several potential solutions exist to correct this problem.

• Make sure the monitor is receiving power. Most monitors have a small light on the front that indicates whether the unit is receiving power. If you have no power, go to the next problem.

• Do any practical jokers or 3-year-olds have access to your monitor? One of the favorite pastimes of both is to adjust brightness and contrast controls until they darken the screen. Adjust the controls to see whether the picture now appears. (Monitors use several different systems for controlling screen size and picture. Check the monitor's documentation for more information.) Try adjusting some of the other controls as well; certain setting combinations could cause the screen to darken.

• If the screen is all white or all gray—instead of all black—and you hear some whining or buzzing noises coming from the monitor, it probably isn't receiving any signal from the video card. Is the cable connecting the monitor to the computer completely inserted? Check all of the pins to make sure none are broken or bent. Try another video cable to connect the monitor and the video card. *(NOTE: Some monitors contain video cables that are connected directly to the monitor and cannot be disconnected. Don't try to disconnect this cable yourself.)*

• Make sure your monitor is listed in the Windows 95 (Win95) system settings. Click the Start button, followed by the Settings command and Control Panel. Double-click the Display icon. Click the Settings tab followed by the Change Display Type button. In the Monitor Type box, you'll see the current monitor displayed. If you need to change monitors, click the Change button. *(NOTE: You might damage your monitor if you choose a setting here that exceeds the capabilities of your monitor. Check your monitor's documentation for specific capability information.)* First, click the correct manufacturer for your monitor, followed by the model. (If your monitor isn't listed, click Standard Monitor Types.) Click OK, followed by Close to save your changes.

• Listen and watch for a few signs as you turn on the computer. If you hear a single short system beep a few seconds after turning on the PC, the computer is signaling that it has completed its internal tests successfully, meaning a display problem probably lies with the monitor. You also can watch the hard drive indicator and power

lights on the front of the computer case as you turn on the machine. If these are blinking and lighting properly for up to 90 seconds after the monitor turns on, the computer itself probably is functioning properly. If Win95 or Windows 3.1 is loading properly (and you have speakers attached and turned on), you eventually should hear the opening sound you've set up for Windows.

If, however, the beep is garbled or silent or the hard drive isn't working, you have a problem with an internal component—possibly the **motherboard** (main circuit board)—rather than the monitor. If you hear two short beeps, or one long beep and two short beeps, and the PC continues to appear to work properly minus the display, the problem probably lies with your video card.

Problem: The monitor isn't receiving power.

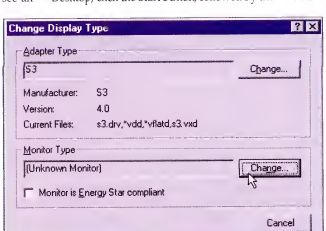
Solution: If the monitor isn't receiving power, its power indicator (usually a green or orange light on the front of the unit) will be dark. If this light is on, but you don't see an image on the monitor, you need to check the above problem for some potential solutions.

To isolate the power problem, you may need to check several areas.

- Push the monitor's power button a few times. Sometimes power buttons stick. You should hear a distinct clicking noise, and the indicator light should turn on and off (after a slight pause) if you've pushed the power button hard enough to make a contact.
- The power cords on many monitors plug directly into the computing unit, meaning the monitor won't work unless the computer has power. *(NOTE: All monitors are connected to the PC by a cable and pin connector to receive video signals, but this connection doesn't provide power to the monitor. A separate power cord provides the electrical power.)* Normally in this situation, the monitor's switch is left on at all times. Then, when the computer is turned on, the monitor's switch already is turned on and the monitor has power. When the computer is turned off, the monitor turns off because its power comes through the computer. Turn on the computer before trying to turn on the monitor.
- Make sure the power cord is plugged completely into the monitor's and computer's sockets.
- Make sure the power strip or outlet you're using is working properly. Try another electrical device in the questionable outlet. Some power strips can burn out if they're hit by a major power surge; plug the monitor directly into a wall outlet to test it.
- Some monitors have fuses on the back of their cases. The fuse usually looks like a black knob and unscrews. If the fuse is blown, you'll have to replace it. *(NOTE: If you find yourself continually replacing the fuse, an internal portion of the monitor probably is malfunctioning, causing the blown fuse. Take the unit in for repair.)*
- If your monitor still isn't receiving power, it's probably broken. Take the unit in for repair. (See sidebar.)

Problem: My monitor goes blank and shuts off after some inactivity, even though I've set up a screen saver.

Solution: Your monitor probably has its energy-saving features activated. At the Win95 Desktop, click the Start button, followed by the Settings command and Control Panel. Double-click the Display icon and click the Screen Saver tab.



A monitor's problems may simply be incorrect settings. Check your monitor's setting through the Change Display Type window.

The screen saver area is in the upper half of the window. You can choose the type of screen saver you want and the length of time Win95 will wait for input before activating the screen saver.

If your monitor contains energy-saving features, the lower half of the window will be available for use. (If not, it will be dimmed.) The Low-Power Standby feature will blank your screen after the specified period of inactivity (the picture returns when you move the mouse or press a key). The Shut Off Monitor feature turns off the monitor. These features are advantageous because the monitor drains a lot of electrical power while it's running. To activate these features, click the box to the left of the feature and place a check mark in it. Remove the check mark to deactivate these features.

To change monitor settings in Windows 3.x, double-click the Windows Setup icon in the Main program group. Your monitor setting is shown after the Display listing. To change the setting, click the Options menu and select the Change System Settings command. You can click the drop arrow button for Display to see the available monitor settings. Click OK after making the changes. You'll have to restart your computer for the changes to take effect.

Most monitors in use with Windows 3.x won't have energy-saving features. If you do have such features, you'll have little control over them through Windows 3.x, unless your monitor was shipped with its own software. To set a screen saver in Windows 3.x, you can double-click the Desktop icon in the Control Panel window. The Screen Saver area is in the middle of the window.

Problem: I hear clicking, popping, buzzing, and/or whining noises coming from the monitor.

Solution: Sometimes these noises, especially clicking noises that occur when the monitor is turned on, are harmless. Just like some computers make more noise than others, some monitors make more noise than others.

If you hear persistent whining or popping noises each time you use the monitor, it could signal a serious problem, though. First, try cleaning dust off the monitor. The popping sounds may be caused by static electricity from the dust. You also may have a bad power cord. Try replacing it. Set the resolution lower.

If these tips don't help, take the monitor to a repair shop. You could have dust inside the monitor that must be cleaned by a professional (don't attempt to open the monitor's case yourself). If the popping noises are accompanied by a smell similar to bad wiring, the monitor's internal power supply could be damaged.

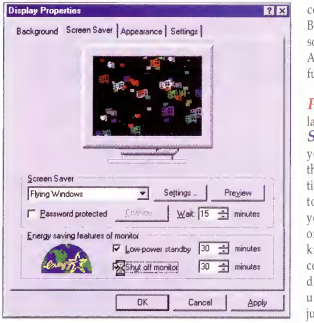
Some monitors emit a high-pitched whine that usually is louder from poor-quality monitors and older monitors. Some people are more annoyed by this whine than others. In some cases, this whine can be lessened or silenced by a repair technician. You also can try turning down the brightness control or changing the monitor's **refresh rate**, which is the frequency with which on-screen images are redrawn.

If the noise is accompanied by a malfunctioning display screen, the monitor may not be receiving signals from the video card. See the first problem in this article for more information.

Problem: The images on my screen appear distorted (with a wavering, scrambled display and moving dots), the images appear as moving lines, and/or the text is unreadable.

Solution: Try adjusting the monitor's window controls. If the monitor's image is too far off center, it may waver and appear distorted. If this doesn't solve the problem, try these tips.

- Look for any devices near the monitor that may be causing magnetic interference with the monitor. Speakers that aren't magnetically shielded, fans, motors, and large electrical sources all can cause magnetic interference. Two monitors placed close together can interfere with each other, too.
- A monitor (unless it's a liquid-crystal display [LCD] screen) uses magnetism to create an image on the screen, meaning other nearby magnets will cause problems. Try moving the devices you suspect several feet away from the monitor, one at a time. If the image improves when you've moved one device away, you need to find a new home for that device. After finding the source, turn the monitor off for a minimum of 20 minutes, giving it time to demagnetize itself.
- Sometimes a component plugged into the same outlet or power strip as the monitor can cause magnetic interference (called **line noise problems**). Try plugging the monitor and PC into an outlet with no other devices or purchase a power strip that contains line filtering or device isolation.
- Your video card driver might be incompatible or corrupted, or the settings for your video card may be incorrect or incompatible with the monitor.
- If you just purchased the monitor, or your monitor recently suffered a fall or major bump, the monitor's tiny interior magnets that control the image could be out of alignment. The magnets guide the electron beams, which form the image on-screen. If the magnets are only slightly out of alignment, the text may appear fuzzy, and you may develop headaches after looking at the monitor for an extended period of time. If the magnets are widely out of alignment, you'll see crooked lines and poor-quality images. If you suspect the magnets are out of alignment, take the monitor to an authorized repair shop.
- Sometimes you'll have a poor-quality monitor, which may cause blurry text and out-of-focus images. (See the last problem in this article for more information.)



Monitor shutting off at strange times? Check the energy-saving properties available through the Display Properties window.

Problem: The image is too bright or dim and/or the image's contrast is too high or low.

Solution: Adjust the brightness and contrast control through the buttons, wheels, or knobs on the front of the monitor. If the controls are at their maximum settings or don't improve the image, you can try some other options. Try moving the monitor to shield it from overhead lights, which make monitors appear dimmer and less contrasted. Using the monitor in a room with fewer light sources will improve the appearance of the monitor, too.

If nothing seems to help, you may need to take the monitor to an authorized repair shop. Older monitors lose their ability to hold sharp contrast and brightness over time. Because of this natural fade, repair personnel can't always improve the image. A newer monitor, however, may be malfunctioning and need repairing.

Problem: The image window is too large or too small.

Solution: Nearly all monitors let you control the centering and size of the display, both horizontally and vertically. Some have menu or select buttons on the front of the case that let you control these features or open an on-screen menu; others have control knobs alongside the brightness and contrast knobs. Check your monitor's documentation to determine how to use your monitor's system. Try adjusting the buttons until the image is the size you desire.

If this doesn't help, you probably need to change the settings for the screen resolution.

Problem: My monitor won't display as many colors as I want.

Solution: Older monitors may be limited in their display capabilities, and there's nothing you can do to rectify this situation, short of buying a new monitor. But the number of colors your monitor can display nearly always depends on your video card's capabilities.

Problem: The monitor seems to be missing certain colors, or some of the colors don't look right.

Solution: If your monitor displays only 16 colors, some colors may not look right (see above problem). If it appears a color is missing or if the monitor appears to have a green or purple tint, however, you may have a different problem.

Monitors use combinations of red, green, and blue to create the colors you see on the screen. Three different electron guns "draw" images on your screen in each of the three primary colors (by lighting the phosphors on the inside of the monitor screen), and your brain then blends the three colors together to create the overall image. If one of the electron guns isn't working properly, your image will seem as though it's missing a color. If, for instance, you're missing the red gun, you won't see red, and the color purple (a mixture of red and blue) will look blue. You also may

see a greenish tint to the entire monitor. This problem may appear intermittently or it may appear at all times.

Check the cables between the monitor and the PC. If the cable has a kink in it or is abnormally stretched, it could block the signal for one of the primary colors. Also make sure the number and arrangement of pins on the cable match the number of holes in the connectors. If your pins don't match the connector holes, your monitor isn't receiving the proper signals. Find a video cable that has the correct pin arrangement to match the connectors on the monitor. *(NOTE: Some video cables are connected directly to the monitor and cannot be removed.)*

The monitor may need repair. Sometimes the connection between the video cable and the circuit board inside the monitor case can become cracked or loose, causing one of the colors to disappear. Don't attempt to repair this yourself; take the monitor to an authorized repair shop (see sidebar).

Problem: I often have a headache after using the computer for an extended period of time.

Solution: Take two aspirin. Just kidding. You can take several actions in trying to alleviate the eyestrain caused by monitors that often leads to headaches.

- Place the top of the monitor either at eye level or slightly below eye level as you sit in your chair. Most monitors use stands that can be adjusted for varying heights. The monitor should be about 18 to 24 inches from your eyes.
- Don't spend too much continuous time at the computer. Taking a short break at least twice an hour will give your eyes a chance to rest.
- Try reducing the glare on the screen. Move lights in the room that shine directly on the screen or move the monitor to shield it from overhead lights. Move the monitor so it doesn't face an outside window. Install a filter over the screen that cuts down on glare (at the expense of image brightness).
- If you have a poor-quality monitor, there is little you can do to improve the image and alleviate eyestrain. (See the next problem.)

Problem: The image on my monitor just doesn't look right.

Solution: If you've tried several of the solutions listed here and in "Video Cards" and the image still looks wrong, here are some last-ditch solution attempts.

- Some older monitors contain a control knob called "Focus," usually on the back of the monitor. Try turning this knob to adjust the image and make it look sharper.
- Clean the monitor screen. Dust on the monitor can make images appear fuzzy.
- Adjust the light near the computer. Bright lights in the room can make the monitor's image appear dim.
- Adjust the monitor's window controls, especially contrast.
- If nothing works, you simply may have a poor-quality monitor. Repair shops can't do much to improve the quality of these monitors. Try using larger system text to make it easier to read. ■

by Kyle Schurman

Caring For Monitors

Monitors come with a long list of "Dos and Don'ts," all of which are important to keeping the monitor in its best working condition. Here are some tips for lengthening the life of your monitor:

- First, and most importantly, *don't open the monitor's case.* We can't emphasize this enough. Opening the monitor's case will ruin the monitor, and it could ruin you. Monitors contain interior power sources that hold a significant electrical charge, even after the monitor's power cord is disconnected, and you could be shocked if you open the case. If a physical repair is needed, take the monitor to an authorized repair shop.

  "We don't recommend the end user open the monitor because there is high voltage inside like a TV," says Simon Wang, technical support manager at ADI Systems Inc., a leading manufacturer of monitors. "Even if you turn off the power, there still is high voltage in there."
- Do give the monitor plenty of free space for cooling purposes. If you stack items around the monitor, you'll probably shorten its life. And if you balance heavy items on top of the monitor, you could warp or crack its case, rendering it useless.
- Don't operate the monitor near a heat source, in a damp environment, near magnets, near motors, in a tight enclosure, or on a rug or carpet.
- Do use the power cord supplied with your monitor because it's specifically created to handle the voltage for your monitor.
- Don't clean the outside of the monitor case with anything but a lint-free cloth or a used dryer sheet (one without perfumes and other chemicals). The cloth can be slightly dampened with water. Unplug the unit before cleaning it. You can clean the monitor's screen with the same items or with a little glass cleaner. Spray the glass cleaner onto the cloth, rather than onto the screen, before using it. Wipe the screen until it's completely dry. "Don't use anything too strong," Wang says. "(Strong liquid cleaners) might damage the colors."
- Do use the stand that ships with your monitor. The vents on monitors are on the back and underneath the monitor, meaning the unit needs to be up in the air slightly to allow proper cooling underneath.
- Don't touch the monitor's screen, if at all possible. Oils and dirt from your hands will remain on the screen.

If your monitor needs repair, you may need to contact the monitor's manufacturer to find an authorized repair shop in your area. Monitors often can be repaired relatively inexpensively, and Wang says their life span averages 5 to 8 years. Before agreeing to any repair charges, though, compare the repair estimate to the cost of a new monitor.

If you decide to purchase a new monitor, make sure it's compatible with the current setup of your computer, especially the video card. □

Ring Around The Web

Enter A Loop Of Sites Focused On Your Interests

If you are a home brewing aficionado or want to become one, you will enjoy surfing the group of 83 World Wide Web sites devoted solely to home brewing—sites you can visit one after another by clicking your mouse at the Fire Brewers Webring (http://members.tripod.com/~firebrew).

If you're not into home brewing, you can get your heart pumping with a visit to the linked sites geared toward multisport enthusiasts at the Multi-Sweat Racing Webring (http://www.multisweatracing.org). This Webring is an information resource for the triathlete, duathlete, runner, swimmer, biker, and race director.

Perhaps you're thinking about getting a Corgi dog and you're not sure of the differences between the breeds. Maybe you also want to know about grooming, feeding, training, breeding, or exercising them. View the home pages of other Corgi enthusiasts at the Corgi Webring and be sure to check out the links to all the pictures of the little, fox-faced dogs (http://www.geocities.com/Heartland/Meadows/1700/webring.html).

Regardless of the subject, someone has probably built a Web site devoted to it and linked it in a **Webring** to sites with similar themes. Visit one site in a Webring, and you can continue clicking the Next button until you end up back where you started; hence the "ring." You can follow the loop to visit every site, jump around randomly, or use the index to see all the sites in the Webring and pick one you want to visit.

Ring Your Bell. It's easy to find a Webring devoted to a topic or issue near and dear to your heart. The online organization WebRing (http://www.WebRing.org) is a free service owned by Starseed Inc. and devoted to all things Webring. Joseph Kasmer, director of marketing and development for WebRing and Starseed Inc., says as of May 7, 1998, there were 49,838 total rings and 573,930 member sites in the WebRing system. He also says WebRing is growing 10% per month.

WebRing's exhaustive RingWorld directory provides **hyperlinks** (connections that take users to another Web page) to the rings and their member pages, tells how many sites make up each ring, and provides a brief content description for each ring. Searching RingWorld is easy. Choose one of the categories or subcategories or enter keywords in the search box to delineate topics. One caveat: When you enter "Roses," for instance, and see 36 rings, do not expect them all to relate to the American Beauties! Blood Roses, Guns N' Roses, Black Roses, and Ring of Dead Thorns are among the links that also pop up.

WebRing does not practice censorship. Kasmer says WebRing has been contacted concerning objectionable content, but since its goal is to help build and maintain rings, it has no desire to remove member sites. It is up to the master or mistress of each ring to determine the content of individual pages in a Webring. WebRing's standard policy is to put objectors in touch with individual site owners.

A rather large percentage of the 100 most popular rings in RingWorld contain adult-oriented material. It would be easy to throw out the baby with the bath water, but there are links to

thousands of informative and entertaining sites that cover diverse topics such as Children's Literature, the Pittsburgh Steelers, Marilyn Monroe, John Grisham, Ford Mustangs, Frank Sinatra, Michael Jordan, Investors' Clubs, *Quake* Players, Daytime Soaps, the Detroit Red Wings, Stained Glass, Home Schooling, Classic Rock, Stephen King, Creole & Cajun Cooking, Mermaids, and Ham Radios. There's even a ring called "The Sarah Webring" that links Web pages solely on the basis of the names of the pages' creators: Sarah!

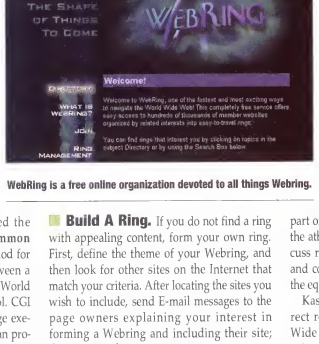
In addition to using the RingWorld directory, we also entered the word "webring" into five search engines (Yahoo!, AltaVista, Excite, Infoseek, AOL NetFind, and Lycos) and came up with thousands of hits. A search engine is the hard way to slog through a search because topics are not broken into categories. You can narrow the results by adding a keyword to "webring." For instance, on Yahoo!, searching "Home+Improvement+Webring" results in seven hits, whereas entering "webring" alone results in 489 hits. Many topics that were easy to find in RingWorld proved a little elusive in traditional search engines. The Children's Literature Gathering (http://the-office.com/bedtime-story/childlit.htm) did not come up on any of the search engines. In RingWorld, conducting a search using keywords such as the site's full name, "literature," "children's literature," or "family" all brought up The Children's Literature Gathering Webring. We also found it simply by clicking the Literature subcategory.

The Host With The Most.

Visit WebRing for a comprehensive biography of the now 20-year-old computer science student who developed the concept of Webrings. He chose **common gateway interface** (**CGI**) **script**, the method for passing information back and forth between a server and an application as part of the World Wide Web's Hypertext Transfer Protocol. CGI uses a high-level programming language executed in real-time, which means that it can provide dynamic links as opposed to the static links written in **Hypertext Markup Language** (**HTML**, the Web's common programming language). Using only HTML to link pages, the entire ring becomes inaccessible when a page is edited, or if a **server** (a computer hosting a Web site) is down anywhere in the ring. CGI script bypasses the unavailable site and lets you continue uninterrupted through the loop. Another advantage of CGI is that the HTML code on each page in the ring does not need editing when adding or removing pages.

WebRing provides a central CGI-bin, which serves as a pointer service. This means when you click the Next button in a Webring, the bin sends an address to your browser, which in turn loads the page. For a more detailed discussion of CGI scripts, see the *PC Novice Guide To Building Web Sites*.

After visiting several Webrings, you may decide to join some by making your site part of the ring. Membership criteria are different for each Webring, so you will want to read the stipulations listed on each Webring's home page. Kristen Patschke, ring mistress of the Corgi Webring, says she has rejected only one site in 84 because the page did not mention Corgis. She thinks omission defeats the purpose of being a member of the Corgi Webring. Diane Tarver from Multi-Sweat Racing says that ring has not had to reject a site but would if a new site was completely self-serving or irrelevant.



WebRing is a free online organization devoted to all things Webring.

Build A Ring.

If you do not find a ring with appealing content, form your own ring. First, define the theme of your Webring, and then look for other sites on the Internet that match your criteria. After locating the sites you wish to include, send E-mail messages to the page owners explaining your interest in forming a Webring and including their site; then wait for them to respond.

To contact a Web site owner, look on the site for contact information or ways to give feedback, such as E-mail.

Tarver went site to site and contacted the ones she liked via E-mail. She says that although some people did not know what a Webring was, once she explained the concept, all agreed to join. Patschke says she posted her request, explained her ring, and asked if anyone wanted to join by sending messages through Corgi E-mail lists. The response was slow at first, she says, but more than 80 pages now make up her ring.

Tarver says WebRing makes it easy to create and maintain your own ring. You must have solid knowledge of HTML and how to create a home page, but once you have a Webring idea and other member sites, visit http://www.webring.org/cgi-bin/wrnewring for information about getting your ring into the system.

Procedures vary, but generally, new sites seeking to join rings send their **Universal Resource Locators** (**URLs**, Web site addresses) by E-mail to the Webring master or mistress with a request to be added to the ring. After the new site has added the appropriate code, Tarver says it is easy for her to add the page to the ring through the management page at WebRing.

As far as maintenance goes, both agree that with WebRing's assistance, they spend minimal time each week on the rings' upkeep. Patschke travels the Corgi Webring every few months to make sure everything is intact, and she checks the **queue** (sites that have expressed an interest in joining the ring and are in the process of adding the Corgi Webring code to their pages) every few days.

The benefits of joining or starting a Webring go beyond easy surfing. Tarver says that forming the Multi-SweatRacing Webring has made advertising races and events and posting results extremely efficient and easy. She says the **newsgroup** (where users exchange text messages) is a special part of the site because it provides a forum for the athletes, race officials, and directors to discuss races. Manufacturers frequently step in and comment on technical aspects of some of the equipment.

Kasmer says Webrings provide a more direct route to sites of interest on the World Wide Web. Not only can Webring members enjoy more traffic, but visitors can limit their surfing to sites of known interest. Webrings are for the pleasure of the 'Net surfers, but Kasmer says advertisers and merchants benefit considerably from Webrings because they can more easily locate larger target audiences. ■

by Katie Powers

Internet Phone Calls

it is sent, the data is compressed by a special **com**pression/**de**compression (**codec**) program, of which there are various types. (Codec is any technology used to compress and decompress data.)

To make a call, one party types in the E-mail address of another or selects a name from an online directory. For a PC to PC connection, the receiving party must be online at the same time. As you speak into your microphone, the computer compresses and transmits your voice as **digital** (binary) data. At the receiving end, it is decompressed and played through the destination computer's speakers. This takes place con- parties can speak in real-time, is generally a time lag of a couple

factors affecting the quality of ion are **bandwidth**, which is the ta connection has for carrying performance. Given a fast con- powerful PC, the audio quality net conversations can match that al telephone calls. You'll need a ance machine to keep up with the ta being transmitted. This means .8 kilobits per second (Kbps) a 90 megahertz (MHz) Pentium- er. The quality of your micro- eakers also makes a difference in , and it's helpful if your sound lio drivers support **full-duplex** -duplex audio, you can transmit oice simultaneously, so you can at the same time as on a regular **half-duplex audio**, you switch h between talking and listening, -talkie. We found that a headset ned microphone was the best so- ds-free speech.

rs beyond your control, such as et traffic, affect your conversa- re running phone software on a **cal-area network** (**LAN**, a group rs physically connected in a lets them communicate and in- ach other), you might be con- e Internet through a **firewall**, a ce set up to manage and filter ic for security reasons. Firewalls with Internet phone software. ions such as conference calls, ad- caller ID, and call screening vary pon your phone software. The scribed here represent the more Internet phone programs on the

thousands of informative and entertaining sites that cover diverse topics such as Children's Literature, the Pittsburgh Steelers, Marilyn Monroe, John Grisham, Ford Mustangs, Frank Sinatra, Michael Jordan, Investors' Clubs, *Quake* Players, Daytime Soaps, the Detroit Red Wings, Stained Glass, Home Schooling, Classic Rock, Stephen King, Creole & Cajun Cooking, Mermaids, and Ham Radios. There's even a ring called "The Sarah Webring" that links Web pages solely on the basis of the names of the pages' creators: Sarah!

In addition to using the RingWorld directory, we also entered the word "webring" into five search engines (Yahoo!, AltaVista, Excite, Infoseek, AOL NetFind, and Lyc up with thousands of hits. A searc hard way to slog through a se topics are not broken into categ narrow the results by adding a ke bring." For instance, on Yaho "Home+Improvement+Webrin seven hits, whereas entering "web sults in 489 hits. Many topics tha find in RingWorld proved a littl sive in traditional search engines Children's Literature Gathering //the-office.com/bedtime-s /childlit.htm) did not come up o of the search engines. In RingW conducting a search using keyw such as the site's full name, "litera "children's literature," or "famil brought up The Children's Liter Gathering Webring. We also fou simply by clicking the Literature category.

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Internet Phone Calls

Talk is cheap, and that certainly applies to the Internet. Using relatively inexpensive (and in some cases, free) software, you can make phone calls on the Internet. For no more than the cost of the software and your Internet service provider (ISP) fee, you can talk with people from all over the world.

Don't expect 'Net calls to have the quality and convenience of a conventional phone call, however. The software, modem speed, type of hardware, connection quality, Internet traffic, and other variables determine the quality of your phone calls. If you make a plethora of long-distance phone calls, though, the savings will soften the blow of the minor inconveniences.

The number of phone programs on the market is growing. Although the trend is toward videophones, which add the extra dimension of seeing the person you're talking to, this article focuses on audio Internet phones. Audio phones tend to be less expensive and easier to use and install than videophones because they do not require the purchase of video capture hardware and software. Being less complex, they are a good choice if you just want to explore Internet **telephony** without being overwhelmed by a program loaded with features geared for the corporate market. (Telephony is the technology of using a PC to make and receive telephone calls.)

We reviewed *FreeTel 1.0*, *Internet Phone 5*, *IRIS Phone 2.5*, *VoxPhone 3.0*, and *WebPhone 4.0*. We were pleasantly surprised at the quality of Internet phone calls we made to people across the globe using these software products.

The Technology. Internet telephony works by digitizing your speech and sending the data in "packets" across the networks of computers that make up the Internet. Before it is sent, the data is compressed by a special **compression/decompression (codec)** program, of which there are various types. (Codec is any technology used to compress and decompress data.)

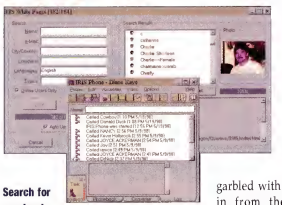
To make a call, one party types in the E-mail address of another or selects a name from an online directory. For a PC to PC connection, the receiving party must be online at the same time. As you speak into your microphone, the computer compresses and transmits your voice as **digital** (binary) data. At the receiving end, it is decompressed and played through the destination computer's speakers. This takes place continuously, so parties can speak in real-time, although there is generally a time lag of a couple of seconds.

Two major factors affecting the quality of data transmission are **bandwidth**, which is the capacity a data connection has for carrying data, and PC performance. Given a fast connection and a powerful PC, the audio quality of your Internet conversations can match that of conventional telephone calls. You'll need a high-performance machine to keep up with the volume of data being transmitted. This means at least a 28.8 kilobits per second (Kbps) modem and a 90 megahertz (MHz) Pentium-class computer. The quality of your microphone and speakers also makes a difference in speech clarity, and it's helpful if your sound card and audio drivers support **full-duplex audio**. In full-duplex audio, you can transmit and receive voice simultaneously, so you can talk and listen at the same time as on a regular telephone. In **half-duplex audio**, you switch back and forth between talking and listening, as on a walkie-talkie. We found that a headset with an attached microphone was the best solution for hands-free speech.

Some factors beyond your control, such as heavy Internet traffic, affect your conversations. If you're running phone software on a company's **local-area network (LAN**, a group of computers physically connected in a manner that lets them communicate and interact with each other), you might be connecting to the Internet through a **firewall**, a special device set up to manage and filter Internet traffic for security reasons. Firewalls will interfere with Internet phone software.

Calling options such as conference calls, address books, caller ID, and call screening vary depending upon your phone software. The packages described here represent the more popular audio Internet phone programs on the

market, but the use of audio and video on the Internet is constantly expanding and changing. The growing popularity of talking over the Internet means that not everyone is using the same phone software. Fortunately, many of today's programs are **H.323 compliant**, meaning they can communicate with 'Net phones from different vendors. The H.323 standard was developed by the International Telecommunications Union (ITU), which coordinates telephone networks around the world. The H.323 standard gives vendors choices regarding the specific H.323 technology they implement. Thus, two products can technically comply with the standard but be unable to communicate with each other, a problem we encountered during our review. Whenever possible, you should use the same 'Net phone software as the person you are calling. If they're using another program, check with your vendor to see if the two are compliant or experiment on the Internet to see if they work together.



Search for contacts in the *IRIS* White Pages and view call history in an activity log.

Start It Up. The first step in making Internet phone calls is to obtain some phone software. We were able to download four of the packages from their respective companies' World Wide Web sites. VoxWare sells its software through E-Tech, a distributor in Canada; we received an attached file via E-mail, but you will probably have to use snail mail.

Installation was relatively easy for all of them. We double-clicked a self-extracting file and followed the setup wizards. We did encounter some extra steps registering VoxPhone with Four11's online directory (see below), a problem shared by all America Online (AOL) subscribers. (We reviewed all five programs using an AOL connection.)

The user interface and phone features varied, but every program provided decent worldwide phone calls. Whether we were calling Texas, Canada, Ireland, or Australia, we usually could hear them clearly. The most annoying thing was the time lag between speaking and hearing the other party's response; while it was usually only a second or two, there were times using IRIS when it extended to four seconds. IRIS provides an animated graphic showing data transmissions; we learned to watch it carefully and pause before talking. When we were not careful and talked too soon, our data transmission became garbled with the one coming in from the other party, making conversation difficult to understand.

Once you're used to talking as if you were on a walkie-talkie instead of a regular telephone, you can make minor adjustments such as tweaking software settings. We encountered a few occasions when one person's microphone setting needed adjusting or the conversation was choppy because there were other Windows applications open (closing them solved the problem in our case). Sometimes we heard an echo of our voice, which we resolved by having the other party adjust his or her speaker and microphone settings.

At times, the quality is simply beyond your control. We had a couple of phone calls consisting mainly of "Hello? Can you hear me? Hello? Hello?", likely due to poor connections and/or Internet traffic. Fortunately, chat window options in the programs let you type messages to the other party if audio is poor.

Talk To Me. To use phone software, you need someone to talk to, and that person must be online. Each program maintains a directory of who is currently online using its software, eliminating the need for psychic powers. You can search that directory for names, use a personal address book of contacts, or dial direct. Searches can narrow the list to a specific country, language, city, topic, name, or E-mail address. Double-clicking a name dials that person, who then has the option of taking or refusing your call.

***VoxPhone* uses a simple but effective interface for making Internet phone calls.**

Because users can enter comments and, in one case, nicknames, the directories include some sexually explicit information. Because of the likelihood of obnoxious calls (we were once asked if we were wearing underwear), you can use the comment line to inform others that your connection is for "Family (or Business) ONLY," although that's no guarantee "Hot2Trot" will not call anyway.

A directory maintained by Four11 (http://www.four11.com) tracks connections of people using a variety of H.323-compliant phone and videoconferencing programs. You can use its White Pages to search for and contact other people or connect to their 'Net Phone site (http://hello.connectedpc.com) to access others who are online and using phone software. With FreeTel, you can talk only with other FreeTel users. Click the Directory (in the full version you can click topic groups) to list users who are online. IRIS conversations must be with other IRIS users online. Clicking an icon opens that package's white pages.

Internet Phone, WebPhone, and VoxPhone are all H.323 compliant. Using VoxPhone, you click Call and choose to list online VoxPhone users, access your personal phone book, make a direct call to a specific person, or access Four11's Web directories. In WebPhone, dial direct or click the Search button to open an Information Search window. Internet Phone lets you dial direct or enter chat rooms within a Community Browser.

Overview Of Features. All five programs were easy to install and had similar voice quality during conversations. What makes the difference are the user interfaces and feature sets.

FreeTel isn't fancy, but it offers enough basic features that it functions well for personal use. Scrolling through the directory was time consuming; there was a definite time lag as the display refreshed. A chat option lets you switch to the keyboard, and you can send files, view a caller log, test and adjust your microphone and speakers, change your personal information displayed online, and set options such as automatically answering incoming calls.

IRIS has those basic features, but adds voice mail, conference calls, video, and options such as auto redial, auto answer, and don't disturb. Their directory information is more detailed, including specifics about the other party's hardware and the time in that part of the world. We experienced the longest transmission delays with IRIS, although we cannot definitely attribute it to the software. The directory loaded quickly and could be searched by additional parameters such as business, fun, or evaluating. A mysterious "Dr. Nick" appeared in our personal address book for unknown reasons, but generally the software worked well.

VoxPhone further expands upon the basic features with call blocking, voice messaging, multiple lines, and five-party conference calls. A unique, fun feature called Voice Fonts transforms your voice into "Bubbling Iridium" or "Carbon Rasp." You can call yourself using VoxPhone to test the voice fonts beforehand, although a robot voice might make your conversation hard to understand. All the programs had acceptable audio quality, but VoxPhone's was the most consistent and best overall. The program's ease of use, quality, and price make it our favorite of those reviewed.

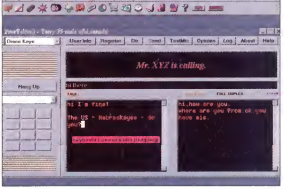
WebPhone's features vary depending upon the version. The Full version offers the most options, including unlimited outgoing messages, voice mails retained, and personal directory entries. That version also includes conference calls, video, call transfer, off-line voice mail, caller ID, speed dial and redial, activity logs, and four lines that feature call holding, muting, do not disturb, and blocking options. The trial version is stripped of most of those features, and the Home version has some limitations. We were troubled by the confusing array of windows that kept popping up at us, delaying conversations while we sorted through windows. At one point, we were bombarded by a dozen error message windows that we could not close, forcing us to restart the program. The phone-like interface with its Bubble Help feature, however, was easy to use.

Internet Phone contains the same features as VoxPhone and WebPhone, minus conferencing and with the addition of a Whiteboard. Its directory uses a very different interface. The Community Browser displays icons for different rooms, grouped in five categories: General, Hobbies, Leisure, International, and Romance. Joining a room lets you read a list of who's there. The list displays each person's nickname, name, country, and comment, plus it includes icons to indicate whether the person has video capabilities in addition to audio. The lists and all the graphics took a while to load, plus we experienced more difficulty in obtaining good connections.

Where It's Headed.

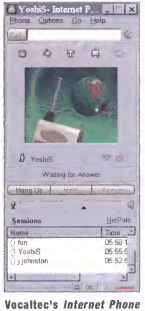
Internet telephony may have had a shaky start, but now the biggest players in the computer and telecommunications industries are clamoring to participate in a revolutionary shift in how we make phone calls. Ma Bell is becoming Ma Internet.

Audio-only programs have given way to those incorporating video. If you have a video capture device, you can take advantage of these packages, or you can purchase one-stop solutions such as Intel's Internet Video Phone (800/538-3373, 503/629-7354, http://www.intel.com), which includes the video capture hardware. *Microsoft Internet Explorer* and *Netscape Navigator* have their own videoconferencing programs: *Netscape Conference* (or the older CoolTalk) and *Microsoft NetMeeting*. Using these programs, you can talk with and view others, collaborate with others in shared applications, send files, draw with others on a shared Whiteboard, and send messages in the chat function.



Chat windows, such as this one in *FreeTel*, are helpful in pinpointing problems and clarifying hardware options.

Eventually, using your Internet connection to make phone calls will be as common as picking up the traditional receiver today. Need to plan a vacation? Conference call with your siblings across the miles and surf the Web together as you compare notes on where to go. Have a question as you view a company's Web site? Click its phone number link and talk to a representative without leaving the site. Sharing audio and visual data will be easy. Whether it will continue to be cheap is unknown. Telephony providers are exempt from service fees levied on conventional telephone companies, but a change by the Federal Communications Commission regarding fees could wipe out the cost benefits provide by Internet phone services. Exactly what lies ahead is a tough call to make. ■



Vocaltec's *Internet Phone* lets you dial direct.

by Diane Kaye Walkowiak, M.A.

For More Information:

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Internet Phone
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IRIS Phone
$14.95
MMArt/IRIS Systems
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http://irisphone.com

VoxPhone Pro 3.0
$29.95
Voxware Inc.
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WebPhone Home
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(888) 638-7732, (561) 997-4001
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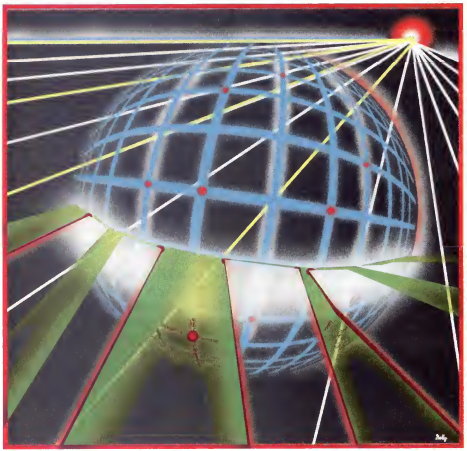

Before you head out on the World Wide Web, you should stop to check its conditions. You don't want to sit amid miles of backed-up traffic—do you? Take a look at the Internet's traffic report and its forecast before setting out on an online journey.

Tools such as the Internet Weather Report (IWR) and Internet Traffic Report allow you to predict the best times to download that colossal file, comb that Web site based in Egypt, or peruse other assorted things on the Web.

Checking The Weather. The IWR (http://www.mids.org/weather) run by the Matrix Information Directory Services (MIDS) provides animated regional maps that illustrate the Internet's conditions for users in various areas. The information is retrieved and compiled every four hours. The IWR measures the latency (round-trip time) from MIDS servers in Austin, Texas, to thousands of Internet domains around the globe. (Domains are groups of connected computers; servers are the central computers in charge of a domain.)

MIDS then transfers this data to maps as circles of various sizes and colors. The size of each circle indicates the average latencies—the bigger the circle, the longer the trip. The color of each circle stands for the number of hosts in a domain (from red (one host) to violet (multiple hosts). This means if you see a small, violet circle, you will probably receive good Internet performance.

Traffic Conditions. The Internet Traffic Report (http://www.InternetTrafficReport.com), a new service provided by Andover.net, helps users predict what future Internet conditions will be like and what the "prime time" is for using the Internet. The traffic report measures the performance of Internet servers and averages this against the "normal" conditions. Of course, this doesn't necessarily mean an absolute speed is set, says Adam Green, chief technical officer at Andover.net.

"What does mean something is whether it's much slower now than it is normally," or knowing what time of day offers the fastest access, he says.

Basically, the Internet Traffic Report records the performance of the Internet worldwide. Multiple Internet servers collect the response times of various routers and do a ping (a command that measures how long it takes a packet of data to get from the original server to another router and back) against the other routers. Routers are parts of a communication system that process data and forward them using the shortest route. Andover.net processes these averages and assigns a score on a scale of 0 to 100, with lower scores signifying slower movement, higher scores signifying faster Internet speeds. Normally the score ranges from about 30 to 70, Green says.

We tracked the Internet Traffic Report and noticed the slowest, most congested times were toward the middle of the day and week. The score fell as low as 20 during the middle of the week, whereas the weekend scores ranged from about 50 to 57. Similarly, the lightest traffic and best connections usually occurred around 2 a.m. EST, with scores of about 53. Mid-range scores appeared around 6 a.m. EST, with scores a little more than 50. Peak times tended to occur around 4:30 p.m. EST, with the score dipping to about 45.

When you need to visit a popular site or download a large amount of information, you could look at the Traffic Report's data for the past 24 hours on a particular router, continent, or city, and predict the best time to use these routers.

A glance at the report makes one thing clear. One-day and full-week graphics show a clear cycle, where the relative performance dips dramatically in the afternoon, as well as toward the middle of the week. You can avoid some waits by avoiding these heavy usage times. That kind of convenience is available to anyone who learns to use the IWR and the Internet Traffic Report to determine the best times to jump on the Web. ■

by Kay Prauner

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Find It ONLINE

Compiled by Jeff Dodd and Joel Strauch

Armchair Millionaire
http://www.armchairmillionaire.com

Investors who want to mull over the market with their fellow financiers should aim their browsers at the Armchair Millionaire. In addition to its assortment of financial advice, this site, which is aimed at investors who want to make money without much hassle, features the Investors Club, where investors can interact via the site's message boards and chat rooms.

BigCharts
http://www.bigcharts.com

Obtaining stock quotes seems to be one of the ever-popular examples of the best ways to use the Internet. The question is, where can you actually do it? BigCharts is one site offering continually updated quotes for more than 34,000 stocks. It also offers market overviews, index reports, corporate earning statements, and daily charts that cover the stocks that gained the most, lost the most, and were the most active.

Bonds Online
http://www.bonds-online.com

We aren't talking about Mr. 007 here. Bonds Online is all about savings bonds, those debt-security investment vehicles that offer more stability than a volatile stock market can provide. Bond investors will enjoy reading the bond-related news headlines; using the online calculator to determine the value of their bonds, treasury bills, and certificates of deposit; perusing the bond market summaries; and learning almost everything there is to know about this viable investment alternative.

EduStock
http://tqd.advanced.org/3088

If the stock market's potential pay-off excites you, but you're afraid of investing on your own, test the waters in the safe cove of EduStock. It takes you step-by-step through the process of investing in a stock, from learning how the stock market works and researching companies in which you may invest to making a mock purchase and tracking your "investment."

GreenMoney On-Line Guide
http://www.greenmoney.com

Everyone who invests wants to make money. But not everyone who invests is willing to make money at all costs. The GreenMoney On-Line Guide is for the socially responsible investors who want to put their money where their morals are. Visitors to this site can learn what responsible investing means, why it is so important to some investors, and which stocks and mutual funds are socially responsible.

Kiplinger's Financial Calculators
http://www.kiplinger.com/calc/calchome.html

You can find investment calculators all over the Web, but only at this site will you find so many in one place. Kiplinger's Financial Calculators include eight Savings & Investing calculators; 11 Mutual Fund calculators; 12 Bond calculators; nine Stock calculators; 16 Home calculators; 10 Auto calculators; seven Credit Card calculators; and seven Budgeting calculators. Topics covered by the calculators range from how much it costs to raise a child to what it will take for you to become a millionaire. After you plug in the numbers, the calculator digests the information and presents an explanation of the results.

The Motley Fool
http://www.fool.com

Do not count on those who are wise—namely, stockbrokers and money managers—to invest your money wisely, say the developers of the Motley Fool. If you are willing to do your homework, they claim, you can outperform the experts. No, this is not some get-rich-quick scheme. Rather, the Motley Fool is an online resource center designed to help you obtain the information needed to invest your money yourself.

Quicken.com Mutual Funds Homepage
http://www.quicken.com/investments/mutualfunds

During the last 15 years, mutual funds have become one of the most popular investment vehicles. If a substantial portion of your investment savings are tied up in one of the thousands of mutual funds currently available, then this site deserves a place among your online bookmarks. Of special interest to investors are the Fund Family Directory, the Morningstar Profiles, and the Value Line Profiles, where investors can learn about and track the status of every reputable mutual fund family. Visitors to this site also can read the weekly assortment of investment-related articles and link to the rest of Quicken.com.

Social Security Online
http://www.ssa.gov

Although there's some doubt about the future of Social Security, you can view its current status at this Web site. You can read through the list of frequently asked questions about the Social Security Administration (SSA), peruse the Kids Pages (though we are not sure why that is there), or review the SSA's operating statistics and strategic plan. You even can request a Personal Earnings & Benefits Estimate Statement (PEBES) to determine how much you have coming to you.

Smart Ways To Retire With $1 Million
http://pathfinder.com/money/features/retirement

It seems that the magic number for retirement nest eggs these days is $1,000,000. How realistic is that? This site can tell you. Enter the relevant numbers—age, current income, desired retirement income, current savings, expected rate of inflation, etc.—and this site's retirement calculator will evaluate your retirement savings plan. Various graphs and a detailed cash-flow chart show how close you are to achieving your goal. Sponsored by *Money* magazine, this site also offers a general introduction to retirement investing and four scenarios that cover unique investing strategies. ■

Quick Fixes

Most of today's software can always benefit from a few updates, patches, and add-ons downloaded from the 'Net. This month we focus on antivirus programs, probably the application that benefits most from being consistently upgraded. By obtaining the latest information about new viruses, you can be sure your system has the best protection.

Norton AntiVirus

You can visit the following page to obtain more information about updating *Norton AntiVirus* via the World Wide Web, but to actually update it, use the Live Update feature built into the product.

http://www.symantec.com/nav/fs_nav4-95nt.html

Network Associate's ViruScan

ViruScan, from Network Associates (formerly McAfee), makes it even easier to update as it pushes the latest updates and upgrades to your desktop, saving you the trip. For more info, visit:

http://www.nai.com/products/antivirus/virusscan/default.asp

Dr Solomon's Anti-Virus

If you have the wisdom of *Dr Solomon's Anti-Virus* program protecting your system, you will want to stick close to Virus Central. This site contains the latest virus alerts and drivers, as well as statistics and information about all the viruses currently infecting the world. There is also a virus mailing list that keeps you up-to-date on virus info (it doesn't mail viruses to you).

http://www.drsolomon.com/vircen/index.cfm

Quarterdeck's ViruSweep

If you use *ViruSweep* from Quarterdeck, visit the following site and click the Virus Updates link to get the latest Protection.

http://arachnid.qdeck.com/qdeck/products/virusweep

IBM AntiVirus

The following page has the latest updates for the *IBM AntiVirus* program, as well as a free trial version.

http://www.av.ibm.com/IBMAntiVirus/LatestUpdates

Share The Wares

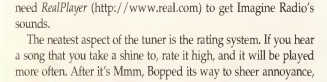
Some of the best apples in the online orchard are the free (or free to try) programs available for download. Each month we'll feature highlights from our pickings.

DLJdirect. If you've considered using your PC and the Internet for online investments, check out the online trading service of Donaldson, Lufkin & Jenrette Inc.: *DLJdirect*. You can download the 2.4 megabyte (MB) software for free from their Web site at http://www.dljdirect.com.

DLJdirect lets you retrieve investment info and breaking investment news via the 'Net and tools including a personalized stock ticker and account and price Alerts! In addition, you can trade stocks, options, and mutual funds with the service.

Imagine Radio. Tune your PC to WNET with Imagine Media's *Imagine Radio 1.1*. It provides a network of 20 original news, talk, and music radio stations. Download this 6MB freeware program from http://www.imagineradio.com. You will need *RealPlayer* (http://www.real.com) to get Imagine Radio's sounds.

The neatest aspect of the tuner is the rating system. If you hear a song that you take a shine to, rate it high, and it will be played more often. After it's Mmm, Bopped its way to sheer annoyance, give it a low rating and take it off your rotation.



The World Wide Web is alive with the sound of music, as well as news and talk shows, with *Imagine Radio*.

Try It Online

The World Wide Web is about more than just data; it offers a chance to get involved and interact online. Check here for sites that let you get the most from the Web.

Project Vote Smart

http://www.vote-smart.org

Don't walk into the polls unprepared. Let the Project Vote Smart Web site prepare you for your democratic casting call. This free site provides contact information, including district office addresses, fax numbers, and E-mail addresses if available, for every member of Congress.

You also can learn what committee your representatives are serving on as well as track campaign finance donations from PACs and individuals.

The real magic begins when you use the site's in-depth tools. With the ZIP-code lookup, you can see a list of your elected representatives at the federal and state levels, in addition to the candidates who will be on the ballots in November. Once you know your representatives, follow the link to their profiles, which includes their voting records in Congress, letting you know whether they're following through on their campaign promises. ■

Project Vote Smart lets us keep tabs on Nebraska Sen. Bob Kerrey.

Comparison Shopping

You'd expect the price of a gallon of milk to vary between, say, Manhattan, N.Y., and Manhattan, Kan. But can buyers of computer equipment expect the same kind of variation? Our secret shoppers set out to find the answer. To determine price variation around the country, we called the following retail chains: Best Buy, CompUSA, Circuit City, and Campo. Our objectives were to check both regional price variation within a chain, but also price differences among chains. We called as computer shoppers to see how salespeople responded to customers' queries (not a national magazine's queries). We checked prices on the following nine products:

- Hewlett-Packard DeskJet 722C printer
- Epson 800 Stylus color inkjet printer
- CTX VL710 17-inch monitor
- Samsung 700B 17-inch monitor
- Sony CPD—100ES 15-inch monitor
- Sony Multiscan CPD—200ES 17-inch monitor
- Imation SuperDisk Drive (parallel port connection)
- Iomega 100MB Zip Drive (SCSI)
- 32 megabytes of random-access memory (72-pin EDO SIMM)

Our quest proves that prices vary enough to make comparison shopping critical to getting the best deal.

■ **For Starters.** Before beginning, we wanted to establish average prices on the products to help serve as a basis for comparison. We started with the World Wide Web site of *PC Today* magazine (produced by *Smart Computing's* publisher, Sandhills Publishing) at http://www.pctoday.com. This free online resource lists computer products, prices, and dealers. You'll find information and reviews on equipment such as systems, central processing units, memory, modems, monitors, storage devices, software, and printers. Since *PC Today* places prices from a variety of retailers side by side, it was a great starting point.

We also went online and checked retail and auction sites. Some of the online retail prices were below those of traditional retailers. (Remember, though, that buying online adds shipping and possibly insurance costs to the purchase price.) You'll find an array of prices and bids, which makes an auction a good place to shop but not to do your initial research.

Of the many online shopping sites we visited, three stood out based upon ease of navigation, competitive prices, inventory, and availability: Cyberian Outpost (http://www.outpost.com), Egghead (http://www.egghead.com), and PC Zone (http://www.zones.com). All three online stores offered toll-free numbers as an alternative to online ordering. We called with questions about inventory and shipping, and friendly people answered the phone at each company. There were no phone menus, no costly minutes languishing on hold, and no curt salespeople.

■ **Price Check.** Things weren't so pleasant when we called stores for prices. This approach to comparison shopping demands patience. None of the stores we called had a human operator. All had machines and menus, and the stores that offered options listed the computer department last. One of the most frustrating aspects of calling stores was waiting for someone to answer the phone once we had selected the computer department. Frequently, no one ever picked up which entailed another call, another walk through the voice menu, and another long wait on hold. None of the stores had 800 numbers, so if you don't live near a retailer any calls you make will be at your expense. Hold times varied, but most were around five minutes, and when salespeople were unsure of the price, there was an additional hold time while they verified the price. Most of the salespeople were polite, but clearly didn't like talking to customers on the phone. Several offered additional price breaks if we would come to the store. Each retail chain offers an online service to help you find the store nearest you.

When asked if product prices were standard from store to store, most salespeople at the retail chains said prices should be the same but there was no guarantee on availability. Calling the same chains across the country and even within the same city didn't necessarily produce the same prices. A spokesperson for Circuit City explained that sometimes individual stores have an overstock, producing lower prices at that store.

Some stores we called give salespeople some discretion on the price. A sales rep at the CompUSA in Edison, N.J., said he could beat the price we were quoted from the CompUSA store in Mt. Laurel, N.J. Competition for commission appeared to influence prices, too. We asked a sales rep at Best Buy in Fullerton, Calif., whether we would find the same prices on the same products at the Riverside, Calif., Best Buy. He said we might, but he wouldn't receive the commission, and if we would just come into the Fullerton store, he'd see what he could do about getting a better price.

After comparing prices, we found that printers had the most stable prices around the country. The Hewlett-Packard 722C inkjet printer varied from a low of $265 in Princeton, N.J., to the $299.99 price we found nearly everywhere else. When we asked an HP public relations representative whether the company sets retail prices, we were told that while HP suggests a retail price, price determination is entirely up to the dealer. Interestingly, HP's expected retail price for the 722C was $349.

Prices for memory varied considerably and the lowest prices quoted were after-rebate prices. We found the lowest price of $55 at the Fullerton Best Buy. There appears to be no uniformity of pricing among stores in the same chain.

Compiled by Katie Powers
Graphics & Design by ReBecca Toof

Best Buys in Southfield, Mich., ($68) and Princeton, N.J., ($69.50) quoted different prices.

Monitors were equally erratic with prices on the 17-inch Sony varying from a low of $499.99 at the Princeton Best Buy to a high of $799.99 at the Baton Rouge, La., CompUSA. Our requests for prices on monitors produced the most response from sales reps, too. When we asked about the price of certain models, we were invariably steered toward different models, that were not necessarily more expensive. The rep at Campo in Baton Rouge said Campo didn't stock CTX monitors and that we should consider a Packard Bell or a Sampo instead. The rep at the Campo store in Birmingham, Ala., had 13- and 19-inch monitors, but nothing in between. The rep at Circuit City in Dearborne, Mich., said that the only monitor worth buying is a Sony, and he offered no alternatives when asked for prices on other products. The sales rep at the Culver City, Calif., CompUSA said he would never try to insult a customer, but we only needed to know prices for the Sony monitors!

While prices varied considerably from store to store, we found no trend of prices being higher or lower based on region. There was no uniformity of inventory or pricing among chains, either. We encourage you to shop around for the best prices when buying computers and peripherals and to definitely mention the price you were quoted at the last store you visited. It could prove your best bargaining tool. ■

Dollar Differences

After checking at various retail stores across the country (Best Buy, Circuit City, CompUSA, and Campo), we found price variations on all the products we researched. The product with the most variation was the monitors. The following charts shows the differences in dollars, from the highest price to the lowest, for four products we priced.

Epson 800 Stylus color inkjet printer	**Iomega 100MB Zip Drive** (SCSI)	**CTX VL710** 17-inch monitor	**32MB memory, 72-pin EDO SIMM**
$73.03	**$24.99**	**$350**	**$43.99**

The Best Buy Price Check

This chart shows the price difference for four products in three Best Buy stores in Michigan, New Jersey, and California.

	Epson 800 Stylus color inkjet printer	**Iomega 100MB Zip Drive**	**Sony Multiscan CPD 200ES** 17-inch monitor	**32MB memory, 72-pin EDO SIMM**
Southfield, Mich.	**$289.99**	**$149.99**	**$659**	**$68**
Princeton, N.J.	**$299**	**$129**	**$499.99**	**$69.50**
Fullerton, Calif.	**$279.96**	**$125**	**$599**	**$55**

Need help with your hardware or software?

Looking for simple explanations on technical subjects?

Send us your questions!

WINDOWS 95

Q: *I have an old computer with a 75 megahertz (MHz) 486 central processing unit (CPU), four megabytes (MB) of random-access memory (RAM), and a 200MB hard drive. I don't have a CD-ROM drive, so I tried taking the Windows 95 (Win95) Setup.exe file off my dad's PC, which has Win95. I tried to run Setup on my PC, but it keeps asking for so many files that this won't work. Can you tell me what is the cheapest, easiest way of installing Win95?*

A: First of all, what you are trying to do constitutes software piracy. Normally, software licenses do not permit copying software off one machine for use on another unless you delete the program from the first machine.

Legality aside, moving programs (especially an operating system) this way is difficult at best, as you can see. The easiest way by far would be to buy the full retail version of Win95 on diskettes, which is sometimes labeled *Windows 95 For PCs Without Windows*. Although this full-version pack costs more and includes fewer goodies than the more common upgrade, you should consider it (even if you had a CD-ROM drive) for the following reasons: (1) You can install it on a PC that has no CD-ROM drive. (2) In an emergency where your Win95 is trashed, it's *much* easier to reinstall because it doesn't require you to first jump through the tricky hoop of getting your CD-ROM drive running without Windows. (3) If you trash Win95 and can't find your old Windows 3.1 diskettes (to prove your right to upgrade) the CD upgrade will refuse to re-install.

It might be smart to buy the diskette upgrade version and spend the money saved on a CD-ROM drive. The diskette version won't have all the extras (such as Backup and Character Map) that come with the CD-ROM version. You can, however, download the extras for free at http://www.microsoft.com/windows95/info/cdextras.htm and many other places on the Internet. Because Windows 98 (Win98) is due out by the time you read this, you might find a bargain on Win95. (*NOTE: Win95 will run poorly on a machine with only 4MB of RAM, though not much worse than Windows 3.1 runs on 4MB of RAM.*)

Q: *I installed Win95 over Windows 3.1 and almost everything went fine. The problem is my CD-ROM drive, which I had deliberately set to be called X:, was changed to E:. I managed to set it back to X:, but every time I install or re-install a Windows component, Win95 thinks I should put the Win95 installation CD-ROM in E:. I'm forced to manually "correct" its misconception by entering the X: each time. Where does Win95 keep this incorrect memory, and how do I change it?*

A: We've also seen this happen when installing Win98 over Win95. Setting your CD-ROM drive to a high letter is a great idea, by the way. That way if you later install more hard drives or partition your hard drive, the CD-ROM drive doesn't get bumped to a higher letter (driving previously installed CD-ROM-based encyclopedias and other programs crazy when their data isn't where they expect it).

Win95 keeps most of its records regarding letters it expects to find things on in its Registry. (It keeps a few in Win.ini and System.ini, but not in this case.) If you change all references on the system from E: to X: that should fix things. Some third-party utilities that handle problems of moved programs and shifting drive letters will globally change E: to X:. *Partition Magic* includes such a drive-remapper, and a freeware utility called *COA32 "Change of Address"* will do such sweeping changes of drive mapping. For COA32 go to http://www.sharewareupdates.com/hotfiles.shtml. You'll find COA about two-thirds of the way down the page.

If you also have another drive named E: active on your system, a global change of E: to X: won't work. In that case, some references in your Registry to E: could be valid and cause catastrophic problems if changed to X:.

In that case, change just Windows' record of where its installation CD-ROM is located. For safety, first make a copy of your Registry. At a DOS prompt use these commands, pressing ENTER after each:

```
attrib -r -h -s system.dat
attrib -r -h -s user.dat
copy system.dat system.bak
copy user.dat user.bak
```

Then edit your Registry. Click the Start button, then choose Run; type **regedit** in the Open line, and then press OK. In the left window do the following:

- click "+" next to HKEY_LOCAL_MACHINE
- click "+" next to SOFTWARE
- click "+" next to Microsoft
- click "+" next to Windows
- click "+" next to CurrentVersion, then highlight Setup. In the right window highlight SourcePath. Open the Edit menu and choose Modify. Where the field shows E:\Win95\ type **x:\win95** (don't forget the \ at end) instead and click OK.

WINDOWS 95 (CONT.)

Q: *In the November 1997 Q&A, you explained how to hide a file in Win95. I hid some important files, but can't figure out how to retrieve them. Can you tell me what to do?*

A: Here's how we explained hiding files in the previous column:

"Locate the file using Windows Explorer or the Find option under the Start button. Highlight the file, right-click it, and left-click Properties. In the Properties dialog box, click the box next to the word Hidden, then click OK."

Now find your files by opening Windows Explorer and the View menu. Then choose Options and click the View tab. Make sure the radio button next to Show All Files is blackened/marked. (Find takes its cue as to what it will find from Windows Explorer's setting.) Now you can use Find to search for your hidden files, as long as you know something about their names or contents. Once you find a hidden file in Find or Explorer, right-click the file, then click Properties on the resulting menu. Remove the check from the Hidden box.

Note that if someone else suspects a file is hidden on your system and/or knows a bit about its name, folder, or contents, this method of hiding isn't secure. Think of it as a cheap padlock, and don't count on it to hide your secret plans for conquering the world.

WINDOWS 98

Q: *I've heard that running the new Active Desktop option in Win98 can slow things down. How do I know if Active Desktop is present and active? How do I turn it off?*

A: Although Active Desktop is a standard feature in Win98, it is also an option for Win95 users who install the *Internet Explorer 4.0* Web browser. Active Desktop's purpose is to let you incorporate changing "active content" from Web channels or pages onto your Windows Desktop. You could, for example, use active content such as an online newspaper, a stock ticker, or a Web site that feeds you new Hubble telescope photos. This process takes some processing power and a healthy Internet connection, and could bog things down a bit on some systems.

Active Desktop is on if you chose Web style for your Desktop style. Regardless of your original Desktop style, you can select which features to enable. Click Start, then Settings, and then Active Desktop. You can control some aspects of Active Desktop in any open folder by opening the View menu. If you're mainly trying to avoid the Web-like appearance of everything, go into the View menu of any folder, select Options, and then select Classic style. There you also can choose to mix the new traits (such as Web-like appearance and active pages) with old familiar traits (such as double-clicking to open documents).

UTILITIES

Q: *Is there some way to copy one or two files to and from a tape, or just use a file while it's on the tape?*

A: Tape (or, to be more precise, software that runs tape drives) is normally cumbersome if you just want to save or retrieve a few files. That is why, despite their much smaller capacity, many folks choose Iomega's Zip and Jaz drives and other removable drives over tape. But there are at least two software utilities that allow some tape drives to work the way you want. Seagate Software's *Direct Tape Access* (DTA) (408/438-6550, http://www.seagatesoftware.com) and *TapeDisk* (715/235-3388, http://www.tapedisk.com) each treat a tape drive as if it were a hard drive, letting you drag and drop files to a tape and open them from a tape. There are two big differences between these two utilities. TapeDisk works only with the less-common Small Computer System Interface (SCSI) tape drives, while DTA works with almost any tape drive. On the other hand, TapeDisk works in DOS or Windows, while DTA works only in Windows.

With either product you can save any file directly to tape from inside any ordinary program, and can even open, print, edit, and resave a file while it's still on tape. If you have giant graphics, audio, or video files, you can put them on tape and still have reasonably quick access to them. You even could edit large graphics files directly on tape, though it'd be too slow to actually run the video. These products help you get massive amounts of storage really cheaply. In a pinch, either utility would let you install and run a program directly off the tape (though it'd probably run slowly.)

Q: *I know I can view contents of compressed .CAB files, but do you know of any method to search inside a whole group of .CAB files for the one I want without manually scrolling through thousands of lines in hundreds of .CAB files?*

A: Use the Win95 Find applet (located under the Start button) and go to the Advanced tab. There you can type in the file name you're seeking.

Put *.CAB as the name of the file and, say, "assign" in the Containing Text field if you're looking for a file called Assign.com. Once you find the file, see the following question on extracting from .CAB files.

Q: *How do I obtain just one file from inside a compressed .CAB pre-installation file without reinstalling the whole program?*

A: The .CAB on the end of these files stands for "cabinet." First find out which CAB file (see above)

UTILITIES (CONT.)

contains what you need. In Win95 the easiest way to extract from .CAB files is to install the Microsoft PowerToy *CABview* extension to Internet Explorer. (You can download this program at http://www.microsoft.com/windows95/info/powertoys.htm.) That lets you browse .CAB files like a directory and drag and drop from them.

In Win98 it is easy. Once you find the .CAB file you want (using the Find tool or Windows Explorer), right-click the file and select View. That opens a window showing files inside the .CAB file; extract it by double-clicking or right-clicking the file. (These clicking options also may work in some versions of Win95.) Either click method will offer to extract the file and pop up a browser window for your whole computer; there you can highlight where you want the extracted file placed. Alternatively in Win98 you could click Start, Programs, Accessories, System Tools, and then System Information. There click Tools and System File Checker. Then click Extract One File From Installation Disk. Type the name of the file in File To Extract or click Browse. Click Start. In Restore From, type the name of the folder where the .CAB files are located. Click OK.

In both Win98 and 95 you also could use the Extract.exe DOS utility. For example, if you found the file Msdex.exe was in a .CAB file called Win95_04.cab, you would type **extract.exe win95_04.cab msdex.exe** to get it. To learn more about using the extract utility go to a DOS prompt, type **extract/?**, and press ENTER.

COMPUTER HARDWARE

Q: *My Win95 Device Manager shows my system as having four hard drive controllers:*

- *Intel 82371SB PCI Bus Master IDE Controller*
- *Primary IDE Controller (dual fifo)*
- *Secondary IDE Controller (dual fifo)*
- *Standard IDE/ESDI Hard Disk Controller.*

This is a bit puzzling because I have only one Integrated Drive Electronics (IDE) controller built into my motherboard. I do have an IDE controller (which I don't use and thought I'd disabled) on my sound card. Clicking Properties on each controller is unhelpful, revealing only that the first three are "working properly" and that the last one (which has a yellow "!" on it) is not working currently.

Can you explain why Device Manager thinks I have four hard drive controllers? Since the last listed controller isn't working—and apparently doing nothing but annoying Device Manager and me—could I safely delete it?

A: The first three items are normal. The first line is your motherboard's controller, and the two "dual fifo" controllers are just subdevices of it, each representing one place on your motherboard where you can attach an IDE hard drive cable. Usually folks have one hard drive on the primary cable and a CD-ROM drive on the secondary, but you can have up to two (one master, one slave) on each for a total of four drives or CD-ROM drives or other IDE gadgets (such as certain tape drives and some Zip drives). Even if you had four gadgets connected, Device Manager still would show just the first three lines.

The fourth line controller—the ESDI item—probably is the IDE controller on your sound card. Because you disabled it (as you should have if the hard drive and CD-ROM drive were running when you installed the card) it's not working. It may have been detected by Windows before you disabled it; if so, you can delete it, and it'll go away. But sometimes Win95/98 detects even a disabled controller, tests it, finds it not working, and puts either a yellow ! or a red X next to it. If that's what is happening, you still can delete it. Windows, however, will just find it again when you restart your PC. It's doing no harm.

Q: *My house has no grounded (three-plug) outlets. I could plug my computer into the wall by using a two-to-three plug adapter, or even install a three-plug outlet, but the wall wiring itself is only two-wire so the third ground prong wouldn't really be grounded. Is it necessary to have the ground connected?*

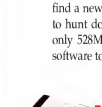
A: The computer will work without a ground, but there are two problems. First, there is a slight chance that if an electrically live component inside touches the interior of the case, and you happened to be grounded when you touched the case, you could get an electric shock—you could even be killed. We admit the odds of this happening are about the same as your odds of winning the Publisher's Clearinghouse Sweepstakes when you haven't subscribed to any magazines—but it is possible. Second, the ground normally prevents static electricity from jumping to, and accumulating on, the case and damaging electronic components. The best approach would be to make normal grounds. If rewiring the house is out, consider hiring an electrician to make one grounded outlet. You could plug a power strip into it then plug all your computer gadgets into it.

Short of that, here's something that, while probably neither safe nor up to code as a normal ground, is better than no ground. If you have a concrete slab floor that sits on the ground, wait until your spouse is away and drill or drive a deep hole in the floor, preferably at least 6 inches deep. Poor a little salt water into the hole to improve the electrical conductivity of it, then drive a nail or metal stake firmly into the hole. Run a wire from the ground prong (the round one) to your new ground stake. Or, if you have metal plumbing, run a wire from the ground prong to a water pipe and clamp it there firmly.

THIS OLD PC

Q: *I have an Epson Equity II with a 20MB hard drive. What do I need to install a bigger, modern hard drive? What about putting in a 1.44MB diskette drive?*

A: Your computer from the early '80s uses an 8086 CPU, almost as ancient as the original IBM PC's 8080 CPU. It runs at 8MHz and 8 bits (compared to the 333MHz 32-bit CPUs on modern computers). To install a modern IDE drive you'll need to find an old 8-bit IDE controller card that fits in the smaller 8-bit expansion slots your computer uses. We found one at http://home.att.net/~david.nunnally/tdn/index.htm#CTRL, but you may have to call or search around. Similarly, to install a 1.44MB, 3.5-inch diskette drive you'll need a newer diskette drive controller. If you're lucky, you can find an 8-bit card combining the diskette drive and hard drive controllers. Remember, though, that old card won't support hard drives larger than 528MB. It's hard to find a new drive smaller than 1,600MB, so you'll either have to hunt down a used smaller one, install a big one but use only 528MB of its capacity, or use a drive's large-partition software to overcome the limit.



MISCELLANEOUS SOFTWARE

Q: *I have an old DOS program called Thoughtline. It interviews me, then creates a speech, article, or report based on my answers. Its interface is ancient, and it won't run under Win95 except in the DOS mode. Even then, I can save my dialogue files, but can't print them. I tried calling Xpercom to find out if it made an updated version but can't find it. Is there a Windows version of Thoughtline?*

A: Thoughtline was a pretty neat program in the '80s. Its artificial intelligence was useful for brainstorming and weaving your bright ideas into organized articles. But we're not surprised it's having troubles under Win95.

Xpercom went belly up in financial juggling around 1993. But the programmer who invented Thoughtline recently released a descendent of the older tool. It's a Win95 program called *A Muse* (E-mail: themuse_@yahoo.com). Like Thoughtline, A Muse interviews you and creates a speech, article, or report. Unlike Thoughtline, Muse can automatically search other databases, or even the Internet, to tap tangible information that you didn't have and incorporate it into your brainstorming and outlines, pulling in quotes supporting your key concepts, even dialog with others who've published on your topic. It can be set up to recognize speech and talk back to you. One caveat: The newer product requires, and runs as an integral part of, *Microsoft Word 97*.

As for forcing your old Thoughtline, or any old print-resistant DOS program to print, here are two solutions:

1) Exit Win95 completely by using Start, Shutdown, then select Restart The Computer In MS-DOS Mode. When at a DOS prompt, restart Thoughtline and try its printing feature from there.
2) A quick way to get text to your printer with many DOS programs is to cut and paste text from the screen. In your case, get to Thoughtline's Would You Like To Review Your Draft screen and select REVIEW DRAFT to get your work onto the screen. If your mouse won't highlight text there, put it into marking/highlight mode. Click the upper-left corner of the window where Thoughtline is running. A menu should appear. Select Edit, then Mark. Highlight text you want. Release the mouse and press ENTER. Open your word processor. Paste text there as in a normal cut and paste operation. Print from there.

UPDATES

In the July 1998 Q&A we said folks who find the old Windows 3.1 swap file (386spart.par) still present on their Win95 hard drive can delete it at a DOS prompt using these commands:

```
c:
cd \
attrib -h -s 386spart.par
del 386spart.par (press ENTER after each line.)
```

Sometimes, however, Win95 will have adopted the old swap file instead of building a new one called Win386.swp. So before deleting the old one it's best to advise Win95 to not use it. Do that by restarting your computer in MS-DOS mode (click the Start button and Shutdown, then choose the MS-DOS mode option) then edit the file called System.ini (found in the WINDOWS directory). If inside it you find a line saying something like Pagingfiles=C:\386spart.par change the line to read Pagingfiles=C:\WINDOWS\Win386.swp (If your Windows isn't on C: change your line accordingly.) ■

Get straight answers to your technical questions. Ask *Smart Computing*! Send your questions, along with a phone and/or fax number so we can call you if necessary, to: *Smart Computing* Q&A, P.O. Box 85380, Lincoln, NE 68501. Please include all version numbers for the software about which you're inquiring, operating system information, and any relevant information about your system. (Volume prohibits individual replies.)

FAQs

This new addition to our popular Q&A column covers the questions we frequently hear, but you may be too shy to ask. Frequently asked questions (FAQs) are a popular service for bringing new users up to speed quickly on the Internet and in computer help files. Check here each month for straight answers on questions every user asks at some point.

Our first installment of FAQs covers the topic all our readers have in common: ***this magazine.***

Why do your Quick Studies cover versions of some packages that are two or three releases old?

Magazine publishing is a job of constantly finding the best way to serve the most readers in limited pages. To that end, our Quick Studies department covers the most popular versions of the most popular applications, as reported in our reader surveys. Software users, much to software makers' dismay, do not all upgrade to a new version the day it is released. Thus, some of our Quick Studies lag behind the newest version available until our surveys show the bulk of readers have upgraded.

When can I expect you to answer the questions I sent to your Q&A and Action Editor departments last week?

Our columns that handle reader questions are some our most popular features. Thus, we receive a stack of letters each week for these columns, making individual and immediate replies impossible. We respond in print to questions that are most likely to help the most readers. If you need immediate assistance, we recommend contacting technical support professionals. Subscribers also can search our archive of former articles for answers at http://www.smartcomputing.com. We're currently working to expand our customer service department to provide more individual responses.

What is the best way to obtain more detailed information on topics I read about?

For more information on products mentioned, contact the companies listed in the article. Contact information appears within each story. If a company listing includes a World Wide Web or E-mail address but no phone number, the company offers no customer service number.

Send questions about specific statements or instructions in an article to editor@smartcomputing.com. You also can fax questions to (402) 479-2104. We will attempt to answer any reasonable question, but our staff currently can't handle user-specific questions such as, "I know your article recommended the Hewlett-Packard, but which scanner is best for *me*?"

I had great luck with most of your instructions, but a tip in a recent article did not work exactly as you said. What gives?

We admit that errors sometimes happen. When we learn of any, we print a correction in the next issue's table of contents so you will always receive the correct information.

Some reader confusion, however, is likely in every issue. Personal computers are variable enough that our directions, even after testing on various machines, almost definitely will not work for everyone in a mass audience. We strive for least-common-denominator instructions that work in most cases. If instructions seem incorrect, pay attention to what is happening on your system and decide whether the problem is unique to your PC. You may discover, for example, that one switch, not an entire command string, is failing. Or you may notice a decision you made at your Windows installation keeps you from correctly implementing our tip. If your testing seems to indicate an error, please let us know so we can recheck the information.

What products beside the monthly magazine do you offer?

Smart Computing is part of a family of computer publications from Sandhills Publishing in Lincoln, Neb. The 8-year-old monthly magazine was known as *PC Novice* until May of 1997, when we changed the name to better reflect our content and the varying skill levels of our core audience. While certain departments in *Smart Computing* continue to provide information for true novices, the bulk of our material is valuable for users of all skill levels. Our new name reflects this and encourages more advanced users to try the publication.

The *PC Novice* name survives on in our Learning Series, Guide To, and other special issues. These magazines, sold on newsstands or through our customer service department, are exhaustive guides on single topics such as Windows 95, the Internet, or troubleshooting. Look for these issues wherever you buy *Smart Computing*.

I often find some Web sites in your Web listings that are incorrect. Are you guys asleep at the switch?

We occasionally make mistakes, but readers should realize that Web addresses are notoriously skittish. A bad day on the Internet, phone lines, or your keyboard (Did you type all those slashes correctly?) all can block your route to a Web site even though the printed Web address is correct. Check your typing, then retry the address a few hours or days later before you assume the address is erroneous.

Understand also that Web sites change addresses and disappear so frequently that printed publications will always be somewhat out of date. ■

Look For These Upcoming Titles From PC Novice & Smart Computing

Office 97

Learn how to make the most of the applications in *Microsoft Office 97*. Includes tips on every part of this powerful software suite.

Microsoft Internet Explorer

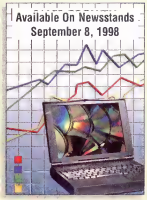
Find out how to get the most from this communication tool. You will discover a full range of options to use.

Internet Basics

This issue walks you step-by-step through your first online connection and gives you detailed tutorials on many Internet activities. Includes software and hardware tips.

Using Windows 98

This issue walks you step-by-step through various features of Win98.



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ACTION

EDITOR

When Ralph Nader can't be reached, bring your computer service problems to our Action Editor column. This page will help you find products, resolve service problems, and keep manufacturers alert to the critical issue of customer relations.

Are you having trouble finding a product or getting adequate service from a manufacturer? If so, we want to help solve your problem. Send us a description of the product you're seeking or the problem you had with customer service. In billing disputes, include relevant information (such as account numbers or screen names for online services) and photocopies of checks. Include your phone number in case we need to contact you. Letters may be edited for length and clarity; volume prohibits individual reply. Write to:

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P.O. Box 85380
Lincoln, NE 68501-5380
or
Send E-mail to editor@smartcomputing.com
or
Fax us at (402) 479-2104

Dear Action Editor,

In June 1997 I bought a Hayes Accura 33.6 kilobits per second (Kbps) internal modem. I sent for the $20 rebate in July and was told I would receive a check within two months. I am still waiting!

I tried calling Hayes' 800 number three times, but it was always busy. I left my information in Hayes' voice mail but never received a call back.

I finally sent an E-mail message and received a response with a name and number. But when I tried calling, the person was away from her desk. I was instructed to call another number but was disconnected while I was being transferred.

Did I get ripped off?

Earl M. White
Carpentersville, IL

Earl did not get ripped off, but he had to wait more than two months (from the time we contacted Hayes) to receive his rebate. Most companies, for obvious public relations reasons, attempt to rectify a problem as soon as we contact them. Not Hayes. After the modem company discovered Earl's rebate request was not in its payment system, it asked him to resend his receipt and paperwork.

After Hayes received his information, Patricia Smith, the person who processes rebates for Hayes, put Earl into the queue of customers waiting for a rebate. Smith says the large number of Hayes customers has forced a 12-week wait period. Needless to say, we became as frustrated as Earl. Our E-mail messages and telephone calls were met with responses from Hayes to be patient. Eventually a check did arrive in early May—but from our viewpoint, an 11-month wait is too long.

If anyone has an overdue Hayes rebate, they can contact Patricia Smith at (770) 840-9200, ext. 2783. Her voice mail will probably answer, but she is reliable about returning calls. Smith also can be reached by E-mail at pssmith@hayes.com.

Dear Action Editor,

I am a teacher working with handicapped students. Some students are beginning to develop their handwriting skills. I have them trace letters, words, or their names. The lines on the letters they trace are usually broken. Many of these words are obtained through preschool workbook handouts, but I still must handwrite their name or personal information for them to trace.

I have thought about using dotted or broken fonts to prepare the letters but have been unable to find anything on the Internet or through a number of computer programs. Can you tell me where I might find dotted-line fonts for the IBM and Apple platforms?

Javier Rodriguez
Laredo, TX

A number of font houses can probably help. Using "font house" as a search term in a search engine such as Yahoo! will probably produce at least a dozen.

We contacted FontHaus, which recommended two fonts: Honeyspot ($39) and Dot Matrix ($119). Company representatives can fax you a sample so you can do some comparison shopping. Or you might look up these selections on the company's Web site at http://www.fonthaus.com. Honeyspot is available for the Macintosh platform, while the Dot Matrix font is available for Mac and PC platforms.

Contact FontHaus at (800) 942-9110 or (203) 367-1993. FontHaus has several libraries with more than 10,000 font selections, so they are sure to have something that fits your needs.

Additionally, Adobe Systems, the industry leader in computer graphics, has thousands of fonts on its Web site, but an Adobe rep doubted the company had dotted-line fonts. The address is http://www.adobe.com. You will find Adobe's font browser under the products icon. Adobe's telephone numbers are (800) 833-6687 or (408) 536-6000.

Dear Action Editor,

Enclosed please find copies of the so-called Sony rebate offer. It's been three months since I sent receipts and bar codes, but I've received minimal response from a number of calls and letters sent.

I can't believe a company the size of Sony has to stoop to this level to sell its products. The amount of $90 is substantial to me, and I will appreciate any help in this matter.

J. Renna
Corona, CA

A Sony representative mailed a $90 check several weeks after we contacted the company. No reason was given why Renna's messages went unanswered.

Anyone needing assistance with a rebate, however, should call Sony's Direct Response line at (800) 282-2848. ■

GLOSSARY
Of Terms

BASIC—Beginner's All-purpose Symbolic Instruction Code. A programming language using common words so as to be easily understandable.

Basic Input/Output System (BIOS)—A special piece of software built into a computer to control the startup process of the machine and other basic functions such as the keyboard, display, and disk drives.

buffer—A temporary storage area in a computer's memory, usually random-access memory (RAM), that hold recent changes to files and other information to be written later to the hard drive.

chip—A piece of silicon with electronic circuitry components embedded in it. A microprocessor is a type of chip. Chips can be thought of as the basic building blocks of computers.

clip art—Predesigned art for use in documents. The term originates from books of art out of which people literally clipped pictures to paste onto their documents. Clip art is included in many programs, such as *Microsoft PowerPoint* and *Microsoft Publisher*.

cluster—A group of disk sectors (usually two to eight) treated as one entity by the operating system or a disk controller for storage purposes.

database—A collection of related information in an easily accessible format, such as a table, form, or report.

device driver—A program that allows a hardware peripheral, known as a device, to communicate with a computer. Some device drivers, such as those for the monitor and keyboard, usually come with the computer, while others, such as those for a sound card or printer, come packaged with their corresponding devices.

executable file—A file that can be executed, or run, as opposed to data files, which are simple collections of data used by executable files.

file conversion—The process of changing the format of a file from one standard to another. For example, to look at *Microsoft Word* documents with *WordPerfect*, it might be necessary to convert the Word documents into WordPerfect documents.

file extension—A "tag" that can serve as an additional identifier for a file beyond the file name. Separated from the rest of the file name by a period, the file extension can be used to indicate whether the file is an executable program (.EXE), a data file (.DAT), and so on.

formula—An expression telling the computer which mathematical operations to perform upon a specific value. Formulas are used most often in spreadsheet programs.

function—A preset equation used to perform mathematical, financial, or statistical calculations in a spreadsheet or database.

home page—The name for the main page in a World Wide Web site where users can find hyperlinks to other pages in the site. It is like a welcome mat for a site on the Internet and may include a logo, table of contents, and hyperlinks to other, related sites.

Hypertext Markup Language (HTML)—A language used to create electronic documents, especially pages on the World Wide Web.

laptop computer—A portable computer smaller than a transportable (or luggable) but bigger than a handheld (or palmtop). Most laptop computers are small enough to allow for easy mobility; a battery or an AC power adapter provides the electricity it needs to operate.

motherboard—The printed circuit board that is the foundation of a computer. The board contains a computer's central-processing unit, random-access memory, chips, and expansion slots. The motherboard is where all the computer's components meet.

operating system—Software, such as Windows 95 and Windows 98, that controls a computer and its peripherals and handles many of the computer's basic functions.

operator—A symbol that denotes an action to take place, such as a "+" to mean addition. Boolean operators (AND, OR, and NOT, for example) are used to verify or disprove truth.

router—The part of a communications network that receives transmissions and forwards them to their destinations using the shortest route available. Data may travel through multiple routers on the way to its destination.

stacks—Memory buffers your computer uses like sticky notes to decide which piece of hardware is next in line to work.

startup—The process of getting a computer ready for operation. This includes internal checks and the loading of software, such as the operating system.

system file—A file used by an operating system or control program.

thumbnail—A smaller version of a graphic or document pages that takes up less space on-screen to allow multiple images to be viewed simultaneously. These smaller images also are faster to load than full-size images.

typeface—A certain design for a character set. The typeface is just one aspect of a character's font. Examples of typefaces you are likely to find in a word processing program include Arial, Times New Roman, and Garamond.

Universal Resource Locator (URL)—A standardized naming, or "addressing," system for documents and media accessible over the Internet.

zip—To compress a file.

Editorial

COMMENT

Define That Line

Responsible Computing Includes Hard Rules About Conduct

Who are we to tackle computing ethics? Such heady issues seem best left to heady people sitting at oaken tables and thoughtfully chewing the stems of their glasses. Let the intellectuals with lots of initials after their names tackle questions about artificial intelligence stealing human jobs and businesses regulating themselves online.

This approach is often both practical (Who can draw a definitive ethical line on every issue?) and liberating (Will we always take the right road when driving in a fog?). But it's incumbent upon every user who sits in front of a monitor to define some black and white from all that fog. Computing ethics aren't simply a topic for discussion within ivy-covered walls. A user needs them as surely as a knowledge of copying files or connecting to the 'Net.

It's an easy discussion while we're swearing off some of the ugly black violations. Few users engage in the big no-nos such as sabotaging a former employer's computer or reading a coworker's E-mail. It's the slippery white indiscretions that make us squirm—because they're often part of our repertoire. What does it hurt to slip over for a look at Morningstar's rating of your mutual funds while you're online checking your employer's stock price? Don't you have the right to skim a private report if someone leaves it laying in the printer?

American workers clearly are fudging in the realm of commonplace computing ethics. The "Technology & Ethics In The Workplace" survey released earlier this year by the American Society of Chartered life Underwriters & Chartered Financial Consultants highlighted the workers' ambivalence. Forty-five percent of respondents confessed to engaging in one or more of 12 unethical actions related to technology. The lowest-rated offense (personal Internet shopping with office equipment) was deemed unethical by 54% of respondents, while the biggest violation (sabotaging the data or system of a coworker or employer) was condemned by 96% of respondents.

Unethical use of technology is common enough to spawn a whole market for data security. Information security expert Winn Schwartau told *Electronic Engineering Times* that techno-bandits break into someone else's computer system about 20 million times each year worldwide. That has made bodyguards for bytes a budget item for many companies.

We might write off some of the wrongdoing as the work of bad people who just do bad things, no matter what tools they have to do it. But many otherwise upstanding citizens slip into digital depravity simply because it's so convenient. The office snoop of the mid-twentieth century took the risk of holding letters up to windows or rummaging through desk drawers to intrude on coworkers' business. Today's informational voyeurs can poke around the office network or sneak around E-mail files without leaving their desks. It even looks to passersby as if they're hard at work. The Web makes theft of intellectual property a cut-and-paste operation. And the difference between making backup copies of software and pirating it is simply how you use the diskettes you create.

We should give serious thought to how each of these situations are approached. If you don't draw the line in advance, you'll surely cross it when the chance arises. Start defining your computer conduct with your existing personal code of conduct. If you'd never steal a watch or book, for example, don't pirate software. Don't rationalize by thinking that the software barons don't need any more money. Copyright ethics aside, do you really want to be labeled an unscrupulous user by those around you? Continue with areas such as defining personal and public data on the company network and then resolving to poke around only in the latter.

Conscientious individuals become the catalyst for clearing up gray ethical areas in whole organizations. For example, as workers increasingly work at home in knowledge-based careers, the line between personal and company time gets fuzzy. Workers can talk with employers to identify what's acceptable personal use of company technology. Establishing the answers to some of these questions will be difficult. But it's less difficult than facing how dark our behavior could become through an accumulation of hundreds of gray violations of computing ethics. ■

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